

# **Exhibit "B"**

**Part 10 of 10**

BSA2 contains all or some of the following: lower densities of current occurrences of federally listed endangered or proposed endangered species, current occurrences of candidate species or other species of concern that are expected to be upgraded to federally protected status within the next few years, and areas judged likely to contain high densities of federally listed species based on habitat assessment, despite the lack of any record of such occurrence to date. Approximately 20,909 acres (8,462 hectares) of BSA2 are identified in PTA proper.

BSA3 is stands of intact native vegetation, with few known occurrences of rare elements. These areas are valuable for their remnant natural vegetation and the potential to support reintroduced special status species. BSA3 areas make up a large portion of PTA, including a large portion of central and southern PTA. There are 45,841 acres (18,551 hectares) of BSA3 occurring within PTA proper.

#### **8.10.2 Environmental Consequences**

In response to the agency and public comments received during the Draft EIS comment period we reevaluated our analysis of the biological resources. As a result of considering these comments and a reanalysis of the available information, we recognize that the impact to biological resources from fire could not be mitigated to the less than significant level. However, these impacts will be substantially reduced as a result of mitigation.

##### ***Summary of Impacts***

Biological resources that have been considered include vegetation communities, wildlife, sensitive species, and sensitive habitats. All biological resources have been assessed for potential impacts from project activities. Significant impacts have been identified from fire and from construction and training activities, both of which would occur to sensitive species and habitat. Significant impacts mitigable to less than significant have been identified for impacts from the spread of nonnative species from construction and troop movements on sensitive species and sensitive habitat. Less than significant impacts have been identified from construction and training on general vegetation and wildlife, for migratory birds from the FTI construction, from noise and visual effects from construction and other project activities on wildlife, from vessel transport on marine wildlife and habitat, and runoff impacts on marine wildlife and coral ecosystems. For a full description of the impact methodology used to determine impact on a resource please refer to chapter 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of significant and less than significant impacts is provided in Table 8-22.

##### ***Proposed Action (Preferred Alternative)***

Implementing the Proposed Action would increase the amount of land used for training ranges and maneuver lands, which would directly and indirectly impact biological resources.

##### ***Significant Impacts***

*Impact 1: Impacts from fire on sensitive species and sensitive habitat.* Wildfire is a great threat to flora and fauna communities at PTA. An increase in construction and training at PTA would increase the likelihood of wildfires, which can spread rapidly and affect areas outside of the initial ignition area.

**Table 8-22**  
**Summary of Potential Biological Impacts at PTA**

<b>Impact Issues</b>	<b>Proposed Action</b>	<b>Reduced Land Acquisition</b>	<b>No Action</b>
Impacts from fire on sensitive species and sensitive habitat.	⊗	⊗	⊗
Impacts from construction and training activities on sensitive species and sensitive habitat.	⊗	⊗	⊖
Impacts from the spread of nonnative species on sensitive species and sensitive habitat.	⊖	⊖	⊖
Impacts from construction and training activities on general habitat and wildlife.	⊙	⊙	○
Threat to migratory birds.	⊙	⊙	⊙
Noise and visual impacts.	⊙	⊙	⊙
Vessel impacts on marine wildlife and habitat.	⊙	⊙	⊙
Runoff impacts on marine wildlife and coral ecosystems.	⊙	⊙	○

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**

- |  |                       |
|--|-----------------------|
| ⊗ = Significant  | + = Beneficial impact |
| ⊖ = Significant but mitigable to less than significant | N/A = Not applicable  |
| ⊙ = Less than significant                              |                       |
| ○ = No impact  |                       |

The use of various types of ammunition, weapon systems, and pyrotechnics during military training increases the risk of wildfire ignition. Proposed actions that could ignite fires include the use of BAX and the AALFTR. Fire sources associated with the proposed SBCT actions are discussed in detail in Chapter 8, Section 8.12, under fire hazards.

Federally listed species are known to occur within the immediate areas of the proposed ranges and in various areas throughout PTA and the WPAA (see Tables 8-20 and 8-21). Vegetation communities of PTA generally consist of montane dry forest and shrubland and subalpine dry forest and shrubland, all dominated by native species, while the WPAA is dominated by nonnative grasses and shrubs. BSAs that occur within the ROI and that would be affected by fire are presented in Figure 8-37. Species that occur within the surface danger zones of the proposed ranges could be affected by munitions during the operation of the proposed ranges. In addition to vegetation loss, major adverse ecological effects of wildland fires include reduced watershed stability, soil erosion, increased risk of weed invasion, and loss of native habitat. Increased fire frequency would affect the structure, composition, and function of ecosystems. An additional detrimental effect from fire is damage of and disturbance to native seedbeds. Though some native plants do show a degree of tolerance to fire and an ability to establish seedlings in a post-fire environment, these species are still not

as vigorous as the nonnative colonizers with which they compete. The spread of nonnative species that results from wildfires is considered a significant impact because nonnative species often out-compete native species and destroy native communities, as addressed in Impact 3. Impacts from fire on sensitive species including federally listed species are expected to be significant. The mitigation measures below will substantially reduce the impacts but not to less than significant levels.

Regulatory and Administrative Mitigation 1. The effects of the proposed action on listed species in the ROI have been evaluated in the ESA Section 7 Consultation with USFWS. The Army will implement all the terms and conditions defined in the Biological Opinion issued by USFWS for current force and SBCT proposed actions on the island of Hawai'i, including the PTA Implementation Plan. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementation of the proposed action. The Biological Opinion is available upon request.

The Integrated Wildland Fire Management Plan for Pohakoloa and Oahu Training Areas was updated on October 2003. The Army will fully implement this plan for all existing and new training areas to reduce the impacts associated with wildland fires. The plan is available upon request.

Prescribed burns will require separate ESA Section 7 consultation with USFWS.

Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat. The Proposed Action would result in short- and long-term impacts on listed species and their designated critical habitat within the ROI as a result of construction and increases and changes to training. Listed species affected by the Proposed Action include the following species:

- Plants: *Asplenium fragile* var. *insulare*, *Festuca hawaiiensis*, *Haplostachys haplostachya*, *Hedyotis coriacea*, *Hesperocnide sandwicensis*, *Isodendron hosakae*, *Lipochaeta venosa*, *Nerandia ovata*, *Portulaca sclerocarpa*, *Silene hawaiiensis*, *S. lanceolata*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Stenogyne angustifolia*, *Tetramolopium arenarium* var. *arenarium*, *T. consaguinium* ssp. *leptophyllum* var. *leptophyllum*, *Vigna o-wahuensis*, and *Zanthoxylum hawaiiense*.
- Wildlife: *Branta sandwicensis*, *Buteo solitarius*, *Hemignathus munroi*, and the palila (*Loxoiides bairdii*).

The latest designation for plant critical habitat on the Island of Hawaii excluded Army training lands however, federally listed plant species do occur in populations on the Army training lands. Within the ROI one wildlife species, the palila, has critical habitat. Proposed activities border on the palila designated critical habitat (Figure 8-36) in the ROI. There are 2,569 acres of palila critical habitat within the ROI. The Army is responsible for maintaining this habitat in a condition suitable for the palila and, by doing so, contribute to the recovery of the species.

Construction activity and increased training would have adverse impacts on the habitat, deterring the recovery of the species. Battle Area Complex construction, for example, will destroy the easternmost population of *Haplostachys haplostachya*, significantly reducing the distribution of this species. Populations of *Silene hawaiiensis* are known from the footprints of the BAX and AALFTR, and up to 20 percent of the total number of existing plants of this species could be adversely affected by construction. One individual representing less than one percent of the total population of *Zanthoxylum hawaiiense* occurs in the BAX project area and would likely be affected by construction. Construction activities would also increase the spread of nonnative species (Impact 3).

There would be a limited short-term impact on critical habitat from construction of the FTI, the Range Maintenance Facility, and the BAAF runway upgrade/extension. Construction-related dust, noise, the spread of nonnative species (discussed in Impact 3), and increased fire hazard would adversely impact palila federally designated critical habitat. Long-term impacts on listed species and their critical habitat include habitat degradation and reduction from increased human activity, spread of nonnative species due to habitat disturbance, and the higher risk of people bringing nonnative species to the area on their clothing, equipment, or vehicles. The habitat degradation caused by vegetation trampling, erosion, and an increase in the visual presence of Soldiers in and around the critical habitat would damage plant habitat and deter wildlife use of the area. Stryker maneuvers in these areas are likely to adversely affect populations of *Stenogyne angustifolia* and *Vigna o-wahuensis*.

Changes to dismounted training would include activities in TA 23, while avoiding the 1,500 acres (607 hectares) around the MPRC. Troops would be transported to TA 23 by either Strykers or trucks using existing roads. Soldiers would begin dismounted training in tactical formations by walking in dispersed groups overland, toward a given objective. During simulated engagement some Soldiers may use ammunition consisting of blanks and laser weapons and seek concealment or cover during nonlive-fire training. Soldiers could trample listed plant species identified in the area, including *Silene hawaiiensis*, *Asplenium fragile* var. *insulare*, *Hedyotis coriacea*, *Silene lanceolata*, *Spermolepis hawaiiensis*, and *Zanthoxylum hawaiiense* (Figure 8-34). Listed wildlife, such as the nene, have been recorded in the proximity of TA 23 (Figure 8-35) and would be disturbed by noise of approaching Strykers, nonlive fire, and the increase in human presence in the area.

A moderate to large portion of vegetation within the construction footprints (approximately 10 to 30 percent) would be affected during construction of the proposed ranges. Native mammals and birds capable of escaping the area would be expected to vacate during construction and less mobile creatures, such as small mammals (nonnative) and invertebrates, could be killed during or as a result of construction of the proposed projects. Table 8-23 indicates the area of disturbance during construction of proposed ranges. Grading during construction would involve turning up the ground, moving topsoil and vegetation, and staging the heavy machinery area, would cause intensive short-term disturbance to vegetation. This represents a significant impact on native vegetation communities. Listed plant and wildlife are known to exist in the PTA ROI and would be affected by the loss and degradation of the PTA ROI (Tables 8-20 and 8-21).

**Table 8-23**  
**Construction Impacts on Vegetation of Proposed Ranges**

<b>Proposed Range</b>	<b>Area of Construction Impact (approximate acres)</b>	<b>Existing Vegetation Communities (not including the surface danger zone)</b>
Battle Area Complex	600 (243 hectares)	<i>Myoporum</i> dominated tree and shrublands, <i>Metrosideros</i> treelands, <i>Sophora</i> shrublands, <i>Pennisetum</i> grasslands, and barren lava
Anti-Armor Live Fire Range	75 (30.3 hectares)	Barren lava, <i>Metrosideros</i> treelands, <i>Sophora</i> shrublands, and <i>Myoporum</i> dominated tree and shrublands

Source: Developed as part of ESA Section 7 consultation.

Off-road mounted maneuver would occur on approximately 31,230 acres (12,675 hectares) at PTA, primarily in the WPAA (Figure 2-6). Use of PTA Trail and the WPAA would increase the stress on the environment. The impact of all vehicle use in the PTA ROI is estimated at 92,794 MIMs as compared to the 13,659 MIMs based on all current vehicles. Long-term loss and degradation include the loss of open space areas in and around the areas proposed for project construction and in the WPAA where extensive off-road dismounted maneuver is proposed. A direct loss of habitat would be associated with the construction of PTA Trail. Sections of PTA trail would cross biologically sensitive areas with stands of intact, relatively common native vegetation types. Part of the reason that these communities still exist is their remote location. Opening this area up to the more direct effects of humans threatens these communities and their diversity. Hawaiian plant communities evolved without the environmental pressures that are prevalent on major landmasses and thus have no defense mechanisms to cope with these stresses. Fragmenting these sensitive communities interrupts corridors for species to naturally disperse, encourages the spread of nonnative plants, and limits the potential for nonnative species-dominated areas to be reclaimed to reintroduce native species.

Training restrictions on palila critical habitat, established based on ESA Section 7 consultation that occurred after the designation of critical habitat in 1977 (USARHAW and 25<sup>th</sup> ID[L] 2001b), would continue to apply to activities under the Proposed Action. Additional potential impacts such as the effects of increased noise in this area were investigated along with the effects on palila as a part of the most recent (2003) ESA Section 7 consultation. The increased likelihood of training-related fires and the increase in extent and intensity of such a fire is also a threat to this species and is discussed in detail in Impact 1. No off-road mounted maneuvers would be allowed in the critical habitat.

The Proposed Action would significantly impact sensitive species and sensitive habitat from construction and training activities. The mitigation measures below would substantially reduce the impacts but not to less than significant levels.

Regulatory and Administrative Mitigation 2. The Army will implement all the terms and conditions defined in the Biological Opinion issued by USFWS for current force and SBCT proposed actions on the island of Hawai'i, including the PTA Implementation Plan. These measures will help avoid effects and compensate for impacts on listed species that would

result directly and indirectly from implementation of the proposed action. The Biological Opinion is available upon request. Some of the terms and conditions of the BO include:

- If a construction site is within 75 meters (246 feet) of a listed plant occurrence, then construction grading or earth moving operations shall be sprayed with water to reduce airborne dust.
- The Army will maintain a minimum of 12 percent ground cover in off-road maneuver areas on PTA.

The Army will implement land management practices and procedures described in the ITAM annual work plan to reduce erosion impacts (US Army Hawai'i 2001a). Currently these measures include: implementation of a training requirement integration (TRI) program; implementation of an Integrated Training Area Management (ITAM) program; Sustainable Range Awareness (SRA) program; development and enforcement of range regulations; implementation of an Erosion and Sediment Control Management Plan; coordinating with other participants in the Koolau Mountains Watershed Partnership (KMWP); and continued implementation of land rehabilitation projects, as needed, within the Land Rehabilitation and Maintenance (LRAM) program. Examples of current LRAM activities at KTA include: revegetation projects involving site preparation, liming, fertilization, seeding or hydroseeding, planting trees, irrigation, and mulching; a combat trail maintenance program (CTP); coordination through the Troop Construction Coordination Committee (TCCC) on road maintenance projects; and development of mapping and GIS tools for identifying and tracking progress of mitigation measures.

Regulatory and Administrative mitigation measures identified in Section 8.8, Water Resources and Section 8.9, Geology, Soils, and Seismicity, would lessen this impact on sensitive species and habitat.

*Additional Mitigation 2:* The Army proposes to fence or flag where practicable any sensitive plant communities from activities that may take place in the ROI. The Biological Opinions outline fencing for the majority of the sensitive species. USARHAW will evaluate if additional fencing may be necessary.

#### Significant Impacts Mitigable to Less than Significant

*Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat.* The Proposed Action would lead to an increase in nonnative species for the short and long term in the PTA ROI. In general, nonnative species (both plant and animal) pose a threat to Hawaiian native ecosystems (Atlas 1998).

Introduction or spread of existing or new aggressive nonnative plant species can alter native plant habitat and create competition with native and sensitive plants for space, nutrients, and light (Atlas 1998). Invasive plants have an advantage in becoming established in an environment that is stressed and can often out-compete native species that are not adapted to the novel environment created through human activity (Wagner et. al. 1999). Nonnative species often benefit from fires, due to their ability to colonize areas following a burn. In



addition, nonnative plant species are frequently more flammable than native plant species, so that fires are more likely to occur and affect the populations to a larger extent. Although most plant species in and around the proposed PTA Trail and the WPAA are nonnative, there is the possibility that the area could be further disturbed, by increasing the fire hazard for surrounding sensitive areas and species. This impact would affect the sensitive plant species and sensitive wildlife species (Tables 8-20 and 8-21) that are likely to occur within the PTA ROI.

Movement of troops and equipment into Hawai'i from continental US or foreign ports, as well as from other islands or subinstallations within Hawai'i would increase the likelihood of nonnative plant introductions. Construction workers and equipment used to build the PTA Trail, the construction at BAAF, and range ground softening would introduce and spread nonnative species. The BAAF runway upgrade and expansion also risk introducing animal species because the airplanes are more likely to bring in nonnative species by transporting cargo, stored goods, and additional Soldiers.

Implementation of the Proposed Action would increase the number of vehicles traversing PTA Trail, including both Strykers and conventional vehicles. There would be 145 trucks and HMMWVs and 96 Strykers that would travel from Kawaihai Harbor to PTA twice a year. This would be an increase in 105 trucks per event from existing current force use patterns and a 100 percent increase in Stryker use. Ninety percent of the Strykers and sixty percent of the trucks would travel along the PTA Trail. Strykers have a more intense impact on the land than do conventional military vehicles already in use (discussed in Impact 3). The more intense impact on the land would increase the potential for the spread and establishment of nonnative and invasive plant species. Dismounted training in Training Area 23 would likely introduce and spread nonnative species in this high value habitat which supports many sensitive species. The Proposed Action would also increase the likelihood of a fire in the ROI, as detailed in Impact 1.

Nonnative wildlife species are an existing problem in the ROI that would not change as a result of implementing the Proposed Action. The prolonged prohibition of hunting in certain areas due to the presence of unexploded ordnance could be a factor in the proliferation of nonnative mammals at PTA.

Regulatory and Administrative Mitigation 3. As required in the terms and conditions of the Biological Opinions, the Army will:

- Educate soldiers and others potentially using the facilities and roads in the importance of cleaning vehicles, equipment and field gear.
- Educate contractors and their employees about the need to wear weed-free clothes and to maintain weed-free vehicles when coming onto the construction site and to avoid introducing nonnative species to the project site.
- Prepare a one-page insert to construction contract bids informing potential bidders of the requirement.



- Inspect and wash all military vehicles at wash rack facilities prior to leaving PTA to minimize the spread of weeds, such as fountain grass, and animal (invertebrate) relocations.
- Ungulates shall be removed from all future fence exclosures to include the western fence unit and all eastern fence exclosures. The existing fenced areas, Kipuka Kalawamauna, Kipuka Alala, and Puu Kapele shall remain basically ungulate free. In addition, the existing fence exclosures on the Keamuku Parcel around Puu Papapa and Puu Nohonaohae shall remain ungulate free and upgraded if necessary. All ungulates shall be removed from the new fence exclosures by 2010. An annual aerial survey of each fenced area shall be conducted after 2010 to ensure that ungulates have not returned to the fence units. Ground surveys will ensure the fencelines are intact. If ungulates are observed, appropriate hunts or snaring shall immediately commence to remove these animals. The objective is to keep all fence units ungulate free, however, complete removal of ungulates may be difficult to maintain at all times due to the size, topography and/or density of vegetation within the various exclosures. However, the goal is to have all fence units as ungulate free as practicable. The Implementation Team shall address the frequency and logistics associated with fence maintenance and hunting programs to accomplish the ultimate objective.
- If a new introduction of a nonnative animal is found, the source and time of the introduction will be identified, and the area will be searched and treated with an appropriate pesticide to eradicate any other individuals of the target species that may be present. In addition, an area deemed adequate to cover the potential dispersal distance of the new nonnative animal will be searched and treated as well.

USARHAW will follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines Federal Agency duties in regards to preventing and compensating for invasive species impacts. USARHAW will agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. The Implementation of an Environmental Management System will further improve the identification and reduction of environmental risks inherent in mission activities.

In accordance with USDA regulations and requirements, cargo originating outside of Hawai'i will be inspected by USDA and certified to ensure it is not carrying the brown tree snake or other reptiles before transporting cargo for use on training ranges.

*Additional Mitigation 3:* The Army proposes to use native plants in any new landscaping or planting efforts where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.

Less than Significant Impacts

Impact 4: Impact from construction and training activities on general habitat and wildlife. The Proposed Action is expected to have a less than significant impact on general vegetation, wildlife, and habitat at PTA. Impacts from trampling and an associated reduction in vegetative groundcover would result in loss and degradation of habitat for general vegetation, wildlife, and habitat and would be similar to impacts described under Impact 2, for to sensitive species but since these activities would take place primarily in areas of nonnative vegetation less than significant impacts are expected. The Proposed Action would disturb general vegetation and wildlife by removing vegetation, deterring wildlife from foraging, and promulgating other general degradation effects that would result from elevated human activity in the PTA ROI but not to a significant level.

Nonnative vegetation communities and barren lava prevail in the areas of proposed construction. As mentioned in the affected environment section, these communities are all affected by fountain grass, which can rapidly invade a disturbed community. Impacts in these areas would include trampling and disturbance from vehicles and military personnel. Communities within the proposed range areas would be disturbed by trampling and general operation of the ranges. In addition, operation of the proposed ranges could affect biological resources within the impact area and associated surface danger zones. The use of certain types of ammunition increases the chances of starting fires in the impact area and within the surface danger zones. The potential introduction of fire resulting from the operation of the proposed ranges is discussed under Impact 1 and Impact 3.

Due to the weight of the Stryker vehicle, vegetation in areas where the Stryker performs off-road maneuvers likely would be crushed or flattened along tire paths. Stryker maneuvers would generally occur in unforested areas at PTA that contain nonnative vegetation communities. There are areas with high concentrations of native species that will be avoided as discussed under Impact 2. Stryker operations on roads and trails within the installation would not be expected to affect biological resources. Off-road maneuvers would not adversely affect general biological resources. However, the Army would implement SOPs to prevent adverse impacts on biological resources.

Vehicle movements on the ranges and through maneuver training areas would disturb soils and increase the amount of dust in the air. Additional impacts to the soils in the ROI are discussed in section 8.9. Additional impacts associated with dust and air quality are discussed in Section 8.5.

Use of the UAV would occur over much of the land area at PTA but would not be expected to affect biological resources during normal operation. Due to the nature of the UAV, accidents would be possible and could cause wildfires. The impact of potential wildfires within the ROI is discussed under Impact 1.

Lava tubes have been surveyed for arthropods. However, these surveys are incomplete and therefore inconclusive. A more detailed survey will be conducted prior to construction to determine presence and extent of the root dependent arthropods.

Operation of the ranges is likely to displace various wildlife species, such as birds and rodents. Mobile wildlife would vacate areas immediately adjacent to the ranges while the ranges were in use due to disturbance. Displacement would likely be caused by increased human presence in the area, as well as by elevated noise levels. Wildlife within the impact area and associated surface danger zones could be affected by ordnance or other munitions. The potential introduction of fire, which could affect wildlife, is discussed under Impact 1.

Increased noise levels associated with the Proposed Action would not be expected to adversely affect wildlife species at PTA or the WPAA.

*Additional Mitigation 4:* The Army proposes to conduct more intensive surveys of lava tubes identified as potentially supporting native root dependent arthropods. Lava tubes found to contain or support native root dependent arthropods will be avoided where practicable. All generated construction and training related drainage will be channeled away from lava tubes.

*Threat to migratory birds.* The presence of the FTI antennas could significantly affect migratory bird species known to occur in the PTA ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai'i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000). A full description of the FTI is located in Appendix D, but in general, the antennas are under 100 feet (33 meters) high and will be mounted on already existing structures. They will not use guy wires or location lighting though some may have a small light on top as a signal to aircraft operators.

Some migratory bird species known to occur at PTA that could be adversely affected by the Proposed Action include the white-tailed tropicbird, black-crowned night heron, barn owl, golden plover, and northern cardinal (USARHAW and 25<sup>th</sup> ID[L] 2001a).

UAVs would be allowed in restricted airspace over the entire training area, but activity is not anticipated to threaten night-migrating birds. If night collisions with birds did occur, then UAV operations would be halted at night until the USFWS and the Army could agree on a solution.

*Noise and visual impacts.* The Proposed Action would have short- and long-term noise impacts on terrestrial wildlife. These impacts would be negative but less than significant. Areas surrounding the proposed PTA Trail, BAAF runway upgrade and extension, ammunition storage, and range maintenance facility projects would be exposed to greater human noise as a result of these projects. The human noise level at BAAF and the PTA cantonment area is already high. This circumstance, along with the disturbed habitat in which these facilities are located, limits the species occurring there to those that are more tolerant of human activity. Therefore, wildlife in or around these project locations would not be significantly affected by these activities. (Potential noise impacts on the palila are discussed in Impact 2.) Increased noise as a result of construction is not expected to affect terrestrial wildlife, because field

surveys have shown that it is not a significant factor in behavior and does not affect reproductive success (US Army Engineering District Honolulu 2000). Noise produced as part of proposed training activities would be mitigated by ESA Section 7 Consultation. These measures would ensure that noise impacts on sensitive species would be less than significant. No significant visual impacts are expected to terrestrial species.

Less than significant impacts on marine wildlife are expected from vessel noise. LSVs and barges do emit sounds into the marine environment, and these sounds do add a component of low frequency noise to the habitat. Any noise associated with vessels under the Proposed Action is part of existing conditions for this project. Wildlife reactions to noise depend on a variety of factors. It has been shown that marine wildlife can react adversely to the introduction of loud low frequency sounds in their habitat (Richardson et al. 1995). However, in the absence of other low frequency noise sources, some of which have historically occurred in Hawaiian waters (i.e. from other projects, like the North Pacific Acoustic Laboratory or from the Low Frequency Active Sonar project), the magnitude and intensity of noise impacts from LSV and barge vessels are not expected to be significant. Frequency of vessel use is not high, there is no meaningful change in the number of vessels from existing conditions (only six per year more than the current number 60), and animals would not be collocated with the vessels for any significant amount of time.

Less than significant impacts on marine wildlife are expected from SBCT helicopter activity between O'ahu and the island of Hawai'i. Over the ocean, the aircraft normally fly at least 1,000 feet above sea level. There is no change in helicopter activity expected from existing conditions under SBCT. The Aviation Brigade of the 25<sup>th</sup> Infantry Division has local flying rules SOPs that include a 1,000-foot (300- meter) vertical limit over whales and, more recently, over monk seals and dolphins when sighted. These procedures have already been communicated to all units flying in Hawai'i and will be formally incorporated into the local flying rules. The SOP includes a suggestion that future rules will apply to vertical as well as lateral altitude limits. They also suggest altering flight paths once wildlife is observed.

No significant noise or visual marine wildlife disturbances specific to the Proposed Action are expected from other activities at Kawaihae Harbor. This includes disturbance from harbor construction, which would be considered under separate NEPA documentation and is not being done to accommodate ships for this project. It also includes disturbance from establishing a fixed tactical tower at this site. The construction mainly involves the pouring of a small 8-foot by 8-foot concrete pad and an equipment shelter constructed on it, so related activities are minor and are not expected to result in any impacts from construction or from the minor excavation. The pad is not being constructed close to shore and there will be no related run off.

Any construction-related noise impacts are not expected to be significant because they would be short-term and would be mitigated by the reduced transmission of sound through the air-water interface. There is a possibility that a monk seal or more than one seal could haul out on this coastline but since the harbor is so highly trafficked any such individuals would be noticed, and all construction in the area would be halted until the animal left the area.

Impacts on this species from activities in the Sanctuary under the Proposed Action are not considered to be significant.

Vessel impacts on marine wildlife. Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. The increase from 60 to 66 LSV trips a year is minor and not significant. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. (Low frequency and/or mid-range sonars have been shown to cause injury and mortality in marine wildlife [Rossiter 2003], but these emissions typically occur off of vessels engaged in defense training maneuvers, not transport). Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit through Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under the Proposed Action are not considered to be significant. Theater Support Vessel (TSVs) are not in use at this time, however they may be utilized in the future. When and if that occurs, separate NEPA documentation will be done to address impacts from TSV use to marine wildlife. There is a minimal chance of ship strikes (direct hits on marine mammals) with LSVs or barges, but these are considered to be minimal due to the slow speed of the vessels.

The Army informally consulted with NOAA Fisheries on the proposed action in accordance with ESA Section 7. NOAA Fisheries concurred with the Army's determination that the proposed action would was not likely to adversely affect federally listed species, marine mammals or essential fish habitat. (See Appendix E).

Runoff impacts on marine wildlife and coral ecosystems. There would less than significant impacts on marine wildlife and coral ecosystems in the PTA ROI. No significant impacts from potential runoff are expected for marine wildlife resources or coral ecosystems. The expected increase in erosion to the ocean would be within the natural range that exists due to rainfall and runoff variation. The expected increase in erosion at the harbor, described in Chapter 8, Section 8.08, would also be within the natural range that exists due to rainfall and runoff variation. There are no contaminants moving off of the range which is located quite a distance from the coastline. No contamination of surface or ground water is expected (see Section 8-06 Water Quality). There is no runoff carrying contaminants from UXOs to nearshore ocean waters and there are no UXOs in the marine ROI. No water contaminating activities are occurring in the upland portions of the marine ROI habitat and therefore no direct effects from runoff on marine wildlife or coral reefs and their associated organisms would occur.

It is known that continued development and construction along the coastline may add to the decline of this reef system via the following mechanisms: interruption of long-shore transport due to harbor development, consequent siltation of Pelekane Bay, and the close proximity to important cultural sites, causing increased recreational use and human presence (CRAMP 2003). Over time, these mechanisms would further the decline of the coral that is already a special management concern. This is further addressed in the cumulative impacts

section. The proposed construction and use of the military vehicle trail could impact protected species if activities are collocated in the nearshore environment.

However, provided best engineering practices are utilized, it is expected that these will minimize erosion and properly contain potential petroleum spills. If best engineering practices are incorporated into the project plans, vehicle trail construction is not expected to adversely impact protected species. It is also recommended that Best Management Practices (BMPs) be incorporated into the project to protect listed or otherwise protected species which may come into the nearshore project area. BMPs include ensuring that all project personnel are apprised of the status of the listed species in the area, and the protections afforded to these species under federal laws. All project personnel should become familiar with the official NOAA Fisheries brochure explaining the laws and guidelines for listed species in Hawaii. Information may also be downloaded off the NOAA web site. Also, if during project activities any listed or otherwise protected species enter the project area, activities should cease until the animal(s) voluntarily leave the area. Impacts on marine wildlife and coral ecosystems in the ROI waters under this Alternative are not considered to be significant.

The Army informally consulted with NOAA Fisheries on the proposed action in accordance with ESA Section 7. NOAA Fisheries concurred with the Army's determination that the proposed action would not be likely to adversely affect federally listed species, marine mammals or essential fish habitat. (See Appendix E).

#### ***Reduced Land Acquisition Alternative***

Under Reduced Land Acquisition, biological resources impacts at PTA would generally be very similar to the Proposed Action, with the following exceptions:

- QTR2 would not be built on the SRAA but rather on the Range 8 site at PTA. Construction and operation of QTR2 would occur within approximately 120 acres (48.6 hectares) in the vicinity of Range 8. Because QTR2 would be located within an existing PTA range area, collocated with the AALFTR, similar impacts and mitigation measures would occur under Reduced Land Acquisition as under the Proposed Action.
- Additional off-road mounted maneuvers would occur within the PTA ROI.

These changes would result in increases in impacts on PTA biological resources, but would not change the overall significance level of those impacts.

#### ***Significant Impacts***

Impact 1: Impacts from fire on sensitive species and sensitive habitat. Impacts from fire on sensitive species would be similar to those described in Proposed Action Impact 1, but there would be an even greater probability of training induced wildfires. Construction of QTR2 on PTA Range 8 would likely increase the amount of live-fire training at PTA, thereby resulting in the potential to increase the frequency of wildfires, presenting an additional potentially significant adverse impact on sensitive species, such as *Silene hawaiiensis*, and habitat.



Regulatory and Administrative Mitigation 1. The same SOPs, BMPs, and mitigation measures described in Proposed Action Impact 1 and Section 8.12.2 would be applied under this alternative. The implementation of increased fire prevention and fire fighting measures would reduce the severity of this impact but it is still considered significant. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

Impact 2: Impact from construction and training activities on sensitive species and sensitive habitat. Under Reduced Land Acquisition, there would be additional Stryker maneuvering off-road. The 25,855 MIMs proposed for road maneuvers in the SRAA under the Proposed Action would be reallocated to PTA for primarily off-road maneuvers, for a total of 118,649 MIMs. The addition of MIMs in the PTA ROI would exacerbate an already severe impact by causing further vegetation destruction and soil erosion. Compare Figures 8-34 and 8-35 with 2-10 to see the proximity of known sensitive species and habitat to the proposed QTR2 and mounted maneuverability areas. Specifically, Range 8 contains populations of *Silene hawaiiensis*. Under Reduced Land Acquisition, additional natural vegetation communities could be adversely affected, including barren lava, *Metrosideros* treelands, *Sophora* shrublands, and *Myoporum* dominated tree and shrublands. The same SOPs, BMPs, and mitigation measures described under this impact for Proposed Action would be applied for this impact.

Regulatory and Administrative Mitigation 2. The same SOPs, BMPs, and mitigation measures described in Proposed Action Impact 2 and Section 8.12.2 would be applied under this alternative. The implementation of increased fire prevention and fire fighting measures would reduce the severity of this impact but it is still considered significant. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

Significant impacts mitigable to less than significant and less than significant biological resources impacts associated with Reduced Land Acquisition would be largely identical to biological resources impacts associated with the Proposed Action.

### **No Action Alternative**

No Action would result in no new impacts on biological resources, but would involve a continuation of existing impacts. An in-depth analysis of current force training impacts on PTA biological resources can be found in the *O'ahu Training Areas INRMP* (USARHAW and 25th ID[L] 2001a) and the *Endangered Species Management Plan Report (ESMPR) for Pōhakuloa Training Area* (R. M. Towill Corp. 1997c). All conservation measures detailed in the 2003 BO for Routine Military Training and Transformation of the 2<sup>nd</sup> Brigade 25<sup>th</sup> ID(L) at U.S. Army Installations on the island of Hawai'i (USFWS 2003e) will be enacted under this alternative as well. A synopsis of No Action Alternative impacts is given below.

### **Significant Impacts**

Impact 1: Impacts from fire on sensitive species and sensitive habitat. Current force training threatens native habitat and sensitive species in the PTA ROI. Military activities have burned areas of native vegetation and threatened habitat for federally listed flora and fauna. The Army produced a comprehensive wildland fire management plan for PTA, to be finalized in 2004.



Additionally, the mitigation for wildland fire management listed under the Proposed Action should be implemented for current force training, including reducing the densities of fire-adapted introduced species. Mitigation for wildland fires would be the same as those under the Proposed Action. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

#### Significant Impacts Mitigable to Less than Significant

Impact 2: Impacts from construction and training on sensitive species and sensitive habitat. Current force activities occur near designated palila critical habitat. The BAAF and PTA cantonment area are located on or near the critical habitat (Figure 8-36). The primary threat posed to palila and palila designated critical habitat is disruption to vegetation and ecological communities caused by training activities and use of BAAF that occurs in the vicinity of valuable palila habitat. This leads to the introduction and spread of nonnative and potentially invasive species. Palila's food source, mamane seeds and flowers, would be threatened by the introduction of nonnative vegetation (USGS 2001b). The introduction of nonnative animals could continue to lead to increased predation of native species, such as the impacts from mongoose on ground nesting bird species. Nonnative animals could also act as disease vectors and are thought to be one of the reasons for the palila's sharp decline (USGS 2001b and 2001c). Secondly, activities are likely to disrupt and deter use of nearby palila habitat and lower its potential value. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat. Existing impacts on biological resources would continue under No Action. Nonnative plants and animals, some of which may be invasive, have likely been introduced and would continue to be introduced into natural areas at PTA. Transport of troops around the installation and between islands spreads weedy species via clothing and vehicles. In compliance with EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize risk of harm caused by invasive species. Army environmental management (Chapter 2, Section 2.2.4), including research, monitoring, and stabilization projects, would reduce these impacts to the less than significant level. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

#### Less than Significant Impacts

Threat to migratory birds. No threats to migratory birds as a result of routine training have been identified though additional Army programs are outlined in the BO to preserve habitat and monitor species.

Noise and visual impacts. Noise would continue to be produced as a result of current activities. Noise would have an adverse impact on animals in the area due to disturbance but would not significantly affect their behavior and would not lead to a population level decline. Studies such as the *Final Report: A Study to Determine the Effects of Noise from Military Training on the Endangered O'ahu 'Elepaio* (HINHP 1998) show that Army-related noise on O'ahu has not

significantly affected species, including sensitive species, such as the 'elepaio. There are no visual impacts under this alternative.

Vessel impacts on marine wildlife. Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. There are 60 LSV and 4 barge trips per year. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under No Action are not considered to be significant.

#### No Impact

Impacts from construction and training activities on general habitat and wildlife. Training and construction would have no additional impact on general habitat and wildlife. Mounted, dismounted, and live fire activities would continue to be executed in the areas for which they are currently approved. Construction projects would be approved on a case by case basis consistent with current force needs. The ongoing Army environmental programs such as ITAM would ensure no impact to general habitat and wildlife under this alternative.

Runoff impacts on marine wildlife and coral ecosystems. No significant impacts from potential runoff are expected for marine wildlife resources or coral under this Alternative. Best management and best engineering practices described under the Proposed Action Alternative are expected to ensure no impacts. In addition, there are no changes from existing conditions.

**8.11 CULTURAL RESOURCES****8.11.1 Affected Environment*****Region of Influence***

The ROI for this project area is all of PTA (which also includes BAAF), the proposed PTA Trail between Kawaihae Harbor and PTA, and the WPAA identified for acquisition.

***Hawaiian Homelands***

In 1920 the US Congress established the Hawaiian Home Lands Program, which provides a means by which eligible Native Hawaiians can obtain 99-year leases on Hawaiian Home Lands. Hawaiian Home Lands are intended for three purposes: residences, agriculture, and ranching (Department of Hawaiian Home Lands 2003). The Humu'ula and Pi'ihonua Hawaiian Home Land parcels, consisting of 52,315 acres (21,171 hectares), are adjacent to PTA's western boundary, and the Kawaihae parcel, consisting of 10,153 acres (4,109 hectares), is on the coast north of KMR.

***Native Hawaiian History and Tradition******Cultural History***

PTA is part of a larger cultural landscape that includes the sacred mountains Mauna Kea and Mauna Loa and the Saddle area between them. Research by Pualani and Edward Kanahele (1999), Kepā Maly (1997, 1999), Holly McEldowney (1982), Charles Langlas (Langlas et al. 1997), and Usha Prasad and Keone Nunes (SRP 2002), among others, has helped to identify some of the factors that make the area spiritually and historically one of the most important places in Hawaiian tradition and history.

The importance of Mauna Kea, Mauna Loa, and the surrounding landscape can be seen in the abundance of physical or archaeological remains and through the many oral histories that describe historical events and uses of the area (Maly 1999). The region around PTA contained a rich resource zone that supported traditional activities that included bird hunting for feathers and meat, quarrying volcanic glass, and lithic workshop locations for manufacturing the adzes made from Mauna Kea basalt. The Saddle region has numerous trails and served as a much-used passage for travelers moving both cross-island and to the Mauna Kea and Mauna Loa summits.

Cave shelters are abundant due to the extensive natural lava tube systems in the area. These shelters provided refuge from the elements and, because there is relatively low rainfall within the region, they also served as a source of limited water. Archaeologists speculate that ancient Hawaiians practiced different economic activities in this uplands area. Radiocarbon dating of PTA sites (primarily caves) indicates occupation between the 12th and 18th centuries. Some reports indicate the presence of burials at PTA (Haun 1986; Athens and Kaschko 1989; Reinman et al. 1998). Past archaeological work has also suggested that Native Hawaiians planted sweet potato crops in stony areas (Reinman and Schilz 1999), but more recent work supports the hypothesis that excavated pits were used for enhancing bird (petrel) habitat (Hu et al. 1996; Moniz-Nakamura 1999; Williams 2002a, 2002b).

The Ahu a 'Umi heiau on the slopes of Hualālai south of PTA is said to have been built by the legendary chief 'Umi a Līloa around 1600. Both 'Umi and his father, Līloa, are credited, in different accounts, with unifying the island of Hawai'i and with creating the system of land division that persisted through the end of the traditional era. In a broad sense, the entirety of Mauna Kea, whose southwestern slopes form part of PTA's base, is considered holy. From cultural practitioners to academic specialists to oral history informants, that sacredness has been expressed in a number of different ways that are briefly summarized here.

Attempts to translate the Hawaiian sense of Mauna Kea's spiritual meaning for a general audience often focus on two concepts, hiapo (first-born, recipient of special privileges and responsibilities) and lōkahi (unity or harmony). The mountain is seen as the first-born child of Wākea and Papa, the original father and mother, and thus as a personal ancestor of living Hawaiians. It is also seen as the piko or navel through which the island of Hawai'i came into being. In addition, its height helps to make it sacred.

This sense of Mauna Kea as a living elder and holder and transmitter of tradition complements a sense of lōkahi, in which the mountain participates in the larger cycle of life, where each element has a crucial part to play. For example, its height attracts clouds, which bring precious rain. Through hiapo the mountain reaches up to the sacred realm, while through lōkahi it reaches out to the natural world—Hawaiian tradition did not see those two realms as separate.

Several deities are associated with the mountain, perhaps most famously Poli'ahu, the snow goddess of the summit, and Lilinoe, embodying the mist and rain of the Pōhakuloa area. In legend, the region was also the scene of conflict between Poli'ahu and the fire goddess Pele. In geologic terms, this conflict can be seen in the ancient meeting of volcanic fire and mountain ice that produced exceptionally high-quality basalt prized by traditional adze makers.

Water is an important part of the mountain's sacred aspect. These sacred water sources include springs and their importance as part of cultural landscapes, rain clouds attracted by the peak, mist and snow representing its deities, and the icy water of Lake Waiau near the summit, prized for use in religious and medical practice. Water that had not touched the ground was considered especially precious, whether it collected in the cupped part of a taro leaf, in high Lake Waiau, or in the top of a bamboo shoot. Interestingly, the ahupua'a that stretches from the Hāmākua shore to include both Mauna Kea and Mauna Loa peaks and much of the land base for PTA is named Ka'ohe, or bamboo—a plant that was often used as a water carrier.

#### Traditional Activities

It is considered unlikely that the chilly heights of the Saddle area and above were ever the site of permanent homes, but many people passed through the region in pursuit of the numerous and unique natural resources available. These individuals included bird hunters, and gatherers of various plants and other forest resources, and craftsmen in search of high quality wood and fine quality basalt for adze manufacturing. Lava that cooled quickly on the frigid mountaintop yielded an especially fine-grained form of basalt that could be turned into high-

quality adzes and other tools in the days before metal was available. Quarry sites were probably workshops, with associated shrines and temporary dwellings located in caves at lower warmer elevations, some of them within PTA.

Craftsmen turned to the high forest when they needed particularly large trees from valuable upland hardwoods such as māmane. According to Kanahele and Kanahele, the upper slopes were considered more sacred than the lower forests and were left alone as much as possible as conservation areas; when one of the larger and more valuable trees was taken, a major offering, often a human sacrifice, was given in return.

Perhaps the most valuable of the traditional forest resources were the birds. Songbirds were hunted for their plumes, and seabirds that nest were hunted as food. Participants in early 20th century interviews remembered a variety of bird-catching techniques, from tethering a live 'io (hawk) next to a trap, to setting tiny nooses alongside lehua blossoms, to snaking a gummed snare made of 'ie'ie vines into a shallow cave to catch 'ua'u chicks, a delicacy reserved for the ali'i. Most techniques required a great deal of finesse and patience and, in the case of the larger birds, strength and speed as well. Natural holes in the lava beds were improved to make them more attractive nesting places. Birds hunted for their feathers were, hunters recalled, released again in viable condition (Reinman et al. 1998a; Moniz-Nakamura 1999).

Cows, sheep, and other ungulates are a post-contact introduction, but as they were released into the uplands and multiplied, hunting them became a pastime and sometimes a living, pursued by Hawaiian and haole alike. For decades, hunting of the wild/feral creatures continued as more structured and privately owned ranching began to grow. Hawaiian participation, both in the wild hunts and in ranching, has become an island tradition in its own right.

People using the upland resources, as well as people traveling cross-island, developed a network of trails in the prehistoric and early historic eras. Some of those trails are now underneath lava flows, others lie under modern roads, and others may be of questionable location and antiquity, but it is clear that a number of trails crossed the Saddle region connecting the various coastal districts around the island with one another. The Ahu a 'Umi heiau derives some of its importance from its location at the juncture of several of these trails.

The sacredness of the area and Native Hawaiian connection to the Mauna Kea landscape manifests itself in many ways. Oral testimony (Maly 1997) has revealed a number of activities and traditional practices that have been less documented than the ones described above, possibly because they are not as readily reflected in the archaeological or archival record. Some of these practices involve secret family worship, a place of refuge from enemies, and a general sense of the magical deity-inspired restorative and healing power of the higher elevations of Mauna Kea. Prayer and worship are reported to continue to this day (Maly 1997).

Water from Lake Waiau (the small lake on the summit platform of Mauna Kea, described above) is considered sacred and is associated with the god Kāne. Healing power and a spiritual connection is associated with the water, and it is still used by Native Hawaiians. Many generations are reported to have deposited their children's umbilical cords (piko) into the lake, as well as on the summit peak of Pu'u o Kukahau'ula, and this tradition is still practiced by some families (Maly 1997). In addition to reported historic burials, some use Mauna Kea as a place to spread the cremated remains of their deceased loved ones (Maly 1997).

It is likely that in historic times, the landscape and forms of Mauna Kea and Mauna Loa were used as navigation aids both at sea and on land. Mountains to this day are used as physical and emotional benchmarks that help people regain their sense of place. Astronomy, although an important Native Hawaiian traditional component, has not been directly tied to Mauna Kea in the archival record. Because of the "significant association of gods and deity whose forms are seen in the heavens and whose names are also commemorated at locations on Mauna Kea...it is very likely that practices of the native *kilo hoku* occurred on Mauna Kea" (Maly 1999, 20).

The area of the cloud line is considered wao akua (inhabited by gods and spirits, the creators of life), and as such, the kama 'aina (children of the land, or natives) have an even greater respect for these higher elevations. Most of the population were commoners, or maka'āinana, whose daily activities did not involve lands in the wao akua region and were not likely to have visited. However, an elite few, the akua (gods), ali'i (royalty), or kahuna (priests) of high rank, and the class of specialized practitioners who gathered resources or worshipped in the wao akua and mountain region areas in which they practiced cultural activities (Maly 2004 personal communication) made use of natural resources and cared for both natural and cultural resources in the area.

It is difficult to describe the emotional and spiritual link that exists between Native Hawaiians and the natural setting. Hawaiians generally believe that all things in nature have mana, or a certain spiritual power and life force. A custodial responsibility to preserve the natural setting is passed from generation to generation, and personal strength and spiritual well being are derived from this relationship. Because of this belief, Mauna Kea may be the most powerful and sacred natural formation in all Hawai'i.

### ***Historic Overview***

#### ***Pōhakuloa Training Area***

In the late 1800s owners of two large ranches competed for the rights to raise cattle and sheep and to hunt feral animals in the Saddle Region. John Parker II held a lease to the Ka'ōhe lands of PTA from sometime before 1876 through 1891. The Waimea Grazing and Agricultural Company leased Humu'ula to the east of PTA from Kamehameha III around 1860 and raised sheep and also killed wild cattle for their hides. The company built a wagon road from its remote sheep station along the current Saddle Road in Humu'ula to Waimea, through PTA, to transport wool to the harbor at Kawaihae. A portion of this road still



remains within and to the east of PTA. The company also raised sheep in the portion of Waikōloa that forms the WPAA, establishing the Keʻāmuku Sheep Station.

By 1891 the Humuʻula lease was held by the Hackfields' Humuula Sheep Station Company, which in that year obtained the lease for the east side of Kaʻohe, while Parker continued to lease the west side. The company built a number of stone walls in the 1890s, some of which may be the stone walls still standing in the northeastern part of PTA. After 1900 Parker Ranch was expanded to include the Humuula Sheep Station Company and most of the lands in the Saddle (Langlas et al. 1997).

PTA's use as a military installation began in 1942 with the building of the Kaūmana Road for military access between Hilo and Waimea. The road is now known as Saddle Road (SH200), which served as the forerunner to the development of the Saddle Training Area, which primarily consisted of BAAF and the PTA cantonment area. Many members of the local community have, or have had, relatives who worked or trained at PTA. Most of the cantonment area is composed of Quonset huts dating from 1955 to 1958 (Eidsness et al. 1998, 31).

Kawaihae Military Reservation is located on fill land built onto the reef of Kawaihae Bay in the ahupuaʻa of Kawaihae 1 in the district of South Kohala. From Kawaihae Harbor, the proposed military vehicle trail will extend southward and inland through the other ahupuaʻa that make up South Kohala, Kawaihae 2, and Waimea.

### ***Previous Consultations and Reports***

#### ***Areas of Traditional Importance Surveys***

Social Research Pacific (SRP) (2002) has completed a draft report of an oral history survey of PTA, focusing on place names, trail systems, and known Native Hawaiian built structures. The report includes information gleaned from previous works, including McEldowney (1982), which contains oral accounts and written evidence about the Mauna Kea summit area; other various early accounts from western visitors passing through the area (e.g., Maly 1997, 21); and myth and legend material found in Elbert (1959) and Kamakau (1992).

Additionally, SRP (2002) conducted interviews with 29 individuals, both Native Hawaiians and other long-time residents of the island of Hawaiʻi familiar with the area. A field visit with eight of the informants was made to Ahu a ʻUmi heiau, located west of PTA on the slopes of Hualālai, in the Saddle area. Extensive information was gathered about the heiau, which served during the historic period as a resting place along the trails that traversed the central part of the island. The report includes a description of the heiau recorded by Jacques Remy in 1853, based on an interview with Kanuha, an extremely elderly chief at the time of the interview (SRP 2002).

Informants reported the presence of burials both from observation and from oral traditions, but no exact burial locations could be recalled. Informants did know of the continued use of old trails that crossed PTA and of the persistence of bird hunting, one of the major traditional uses of the area from prehistoric times into the early part of the 20th century.



Informants described the use of modified lava blisters (bubbles in the lava flows) to encourage nesting and trap birds. A list of 20 potentially significant place names within and around the vicinity of PTA was prepared; however, little or no oral historical information could be collected concerning these places (SRP 2002).

Maly (1997) conducted a series of interviews that considered not only Mauna Kea itself, but the landscape and view planes of the area. Many of the respondents had knowledge of several of the traditional practices described above. In the 1997 study, and in follow-up interviews, the researchers surmised that the Hawaiian people feel a "deep cultural attachment to the broad spectrum of natural and cultural resources" found in and around Mauna Kea (Maly 1999, 3). Maly recommended that the traditions, sites, practices and continuing significance of Mauna Kea, both historically and today, make it "eligible for nomination as a traditional cultural property under federal law and policies" (Maly 1999, 3).

#### Historic Building Surveys

The DPW Building List includes 138 structures at PTA that are approaching 50 years of age. Kenneth Hays of the USAG-HI DPW Environmental staff has conducted a survey and condition assessment of these structures. An MOA for the treatment of these properties is being developed as part of the PTA master plan.

#### Archaeological Surveys

Inventory surveys of PTA began in the 1960s and 1970s, supported by the Bishop Museum (Rosendahl 1977). Since the 1980s, many archaeological studies have been conducted at PTA, mostly for regulatory compliance (e.g., Cox 1983; Haun 1986; Hommon and Ahlo 1983). Other studies at PTA include Athens and Kaschko (1989), Reinman and Schilz (1993, 1994, 1999), and Streck (1985, 1986, 1990). Surveys in the northern section of PTA include those of Barrera (1987), Kalima and Rosendahl (1991), and Welch (1993), among others. A biological inventory of cave and lava tube systems within PTA recorded cultural resources at the cave entrances and within the underground system (Pearthree, Stone, and Howard 1994). GANDA has completed additional survey work, including surveying potential SBCT project areas, training areas 1, 3, 4, 5, and 21, and potential Stryker maneuver areas north of the cantonment area (GANDA 2002a, 2003d).

There have been many archaeological investigations of the lands traversed by the PTA Trail corridor, including Barrera and Kelly (1974), Clark (1981), Hammatt and Shideler (1989), Hammatt et al. (1988), Langlas et al. (1997), Clark and Kirch (1983), Clark (1987), and Soehren (1980). Cox (1983) conducted a reconnaissance of the military vehicle trail between Kawaihae Harbor and PTA.

Most of the early archaeological surveys at PTA took place in the west and southwest portions of the training area along or off Bobcat Trail. In 1985, PHRI conducted a survey of the Bobcat Trail Habitation Cave Site and the surrounding kīpuka (Haun 1986), and, in 1987, Athens and Kaschko (1989) surveyed the heavily forested and (at the time) undeveloped region of the Multi-Purpose Range Complex (MPRC). In 1992, Ogden revisited the MPRC and conducted data recovery excavations of sites to be affected, as well as a survey of an

additional 20,000 acres (8,094 hectares) (Reinman and Schilz 1999). This resulted in the discovery of 48 new sites.

On the east side of PTA, surveys were not initiated until 1993, when BioSystems Analysis conducted an aerial and pedestrian inventory survey of 6,700 acres along both sides of Redleg Trail (Reinman and Pantaleo 1998b). Following this work, Ogden surveyed four areas east of Redleg Trail totaling about 970 acres (393 hectares) (Williams et al. 2002). Later, an additional area of 2,640 acres (1,068 hectares) to the east of the trail was surveyed and Phase II surface collection and testing conducted of sites in areas previously surveyed (Williams 2002 a and b). In an area with an expected low density of sites, 67 sites and over 1,800 excavated pits were recorded.

Areas that will be directly affected by the Proposed Action were surveyed in 2002 and 2003. Many of the sites are now being formally evaluated.

### ***Known Prehistoric and Historic Resources***

#### ***Pōhakuloa Training Area***

In general, archaeological resources at PTA consist of modified natural features, such as lava tubes, lava shelters, and lava blisters. A 1998 review of previous archaeological studies concluded that lava tubes made up 70 percent of all recorded sites at PTA (Eidsness et al. 1998, 31), and they remain one of the most common site types found in more recent surveys. Other site types include cairn sites, trails, volcanic glass quarries, excavated pits, and lithic workshops. Within these sites, material remains include grinding tools, charred wooden torches, gourds, cordage and matting, woven ti leaf sandals, kukui nuts, 'opihi shells, and other faunal remains. Surface features include stone-lined hearths, cupboards, rock-paved areas, low walls and platforms, rock-filled crevices, ramps, cairns, shrines, open-air shelters, and trails. The region has much value for archaeological research and has produced important information concerning bird hunting, trail systems, and short-term living conditions at higher elevations.

Reinman et al. (1998a) claim the cultural resources at PTA are important for addressing issues about Hawaiian prehistory and history in the uplands region, as well as the development of Native Hawaiian society.

The existence of approximately seven stone shrines attest to the likely ritual activity that went on at PTA. With prayers and ritual permeating traditional Hawaiian life, some of the structures at PTA may be occupational shrines (Buck 1957, 259, cited in McEldowney 1982, 1.10). Cairns (ahu) have been recorded at various terrains, either associated with trail systems or boundary markers, or as just isolated features. There appears to be no pattern to the distribution of cairns across the PTA landscape, and they have been quantified as representing between 10 and 15 percent of known sites. Cairns have also been constructed for military purposes, although the trained eye can usually differentiate military cairns from prehistoric ones. It is also possible that some cairns were constructed for rituals.

*Archaeological Resources*

PTA is rich with archaeological resources, with 291 reported archaeological sites, including both prehistoric and historic Native Hawaiian sites and historic military structures (Tables 8-24 and 8-25). The only site listed on the NRHP is the Bobcat Trail Habitation Cave (Site 50-10-30-5004). Figure 8-38 shows archaeological sensitivity areas at PTA.

Most relevant to the Proposed Action are the archaeological sites found during surveys along Redleg Trail and areas to the east. The BAX and AALFTR projects are located on the west side of Redleg Trail, and the survey conducted by BioSystems Analysis included portions of the two project areas. One site was identified within the boundaries for the BAX, Site 19490, and one within the boundaries for the AALFTR, Site 18673 (Reinman and Pantaleo 1998b). The survey also identified one site, Site 18671, a small lava tube containing cultural features and material, east of Redleg Trail just outside the AALFTR. The northernmost part of the Redleg Trail survey area lay to the east of the BAX. Site 21495, a complex of excavated pits, and Site 21671, a complex of scattered chill glass quarry locations, were located on the east side of Redleg Trail near the BAX boundary (Williams 2002 a and b). One of the four areas surveyed to the south, Survey Area III, is located across Redleg Trail immediately east of the AALFTR boundary. However, all sites recorded in this area lie in the eastern portion of the survey area well outside the AALFTR (Williams et al. 2002).

**Table 8-24**  
**Summary of Known Cultural Resources at PTA and WPAA**

	Total Archaeological Sites	Sites Listed, Eligible, or needing DE	Area Surveyed for Archaeological Sites	Potential Historic Structures	Buildings Listed, Eligible, or Needing DE
<b>PTA</b>	291	291 (290 DE)	33,500 acres (13,557 hectares)	138	0
<b>WPAA</b>	96	95 (DE)	All 23,000 acres	2	2 (DE)
<b>PTA Trail</b>	6	6 (DE)	Unknown	0	0

Source: IARII 2003; Roberts et al. 2003

Notes: "DE" means a site or building that has not yet been found ineligible for the NRHP and therefore must be treated as eligible pending such a finding.

GANDA conducted a recent survey of the entire proposed area for the AALFTR that revealed the presence of 21 lava tube caves, five of which were found to contain cultural materials (Table 8-26) (Roberts et al. 2003; IARII 2003; GANDA 2002a). One of these had been identified during earlier surveys. All five lava tubes contained evidence of their use as shelters or temporary habitation areas, but in one site three upright stones were found on basalt ledges, suggesting that these may have been shrines. Two complexes of excavated pits and a lithic scatter representing a workshop area were also found during the survey. A total of eight archaeological sites are located in the AALFTR.

**Table 8-25**  
**Archaeological Sites Recommended as Eligible to the NRHP at PTA**

<b>State Site Number 50-10-31-</b>	<b>Site Type</b>	<b>Site Function</b>
05000	Lava Tube	Shelter
05001	Lava tube	Shelter
05002	Wall	Ranching
05003	Lava tube	Shelter/habitation
05004	Lava tube	Shelter/habitation/religious
05005	Lava tube	Shelter/habitation/religious
05006	Trail	Transportation
05007	Trail	Transportation
05008	Trail	Transportation
05009	Trail	Transportation
07119	Wall	Ranching
10220	Lava tube	Shelter/habitation
10221	Lava tube	Shelter/habitation
10222	Lava tube	Shelter/habitation
10265	Lava tube	Shelter/habitation
10266	Lava tube	Resource procurement
10267	Lava tube	Shelter/habitation
10268	Lava tube	Resource procurement
10269	Lava tube	Shelter/habitation
10270	Lava tube	Water procurement
10271	Lava tube	Resource procurement
10271	Ahu	marker
10272	Overhang shelter	Shelter
10644	Lava tube	Shelter
10645	Lava tube	Shelter
10646	Lava tube	Shelter
10647	Lava tube	Shelter
10648	Lava tube	Shelter
10649	Lava tube	Shelter
10650	Lava tube	Shelter
10651	Lava tube	Shelter
10652	Lava tube	Shelter
10653	Lava tube	Shelter
10654	Lava tube	Shelter

**Table 8-25**  
**Archaeological Sites Recommended as Eligible to the NRHP at PTA** *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
10655	Lava tube	Shelter
10656	Lava tube	Shelter
10657	Lava tube blister	Shelter
10658	Lava tube	Resource procurement
14638	Site-complex (enclosures, lava tube blisters, wall, C-shape, lithic scatter, overhang shelter	Lithic workshop, resource (lithic) Procurement/shelter/workshop/trail?
17116	Lava tube	Shelter/habitation
17117	Ahu	Marker
17118	Ahu	Marker
17119	Ahu complex	Unknown
17120	Ahu	Marker
17121	Ahu	Marker
17122	Ahu	Marker
17123	Ahu	Marker
17124	Ahu	Marker
17125	Lava tube	Resource procurement
17126	Overhang shelter	Shelter
17127	Overhang shelter	Shelter
17128	Overhang shelter	Shelter
17129	Overhang shelter	Shelter
17130	Ahu	marker
17131	Overhang shelter	Shelter
17132	Overhang shelter	Shelter
17133	Overhang shelter	Shelter
17134	Overhang Shelter	Shelter
17135	Overhang shelter	Shelter
17136	Lava Tube blister	Shelter
17137	Quarry	Resource procurement
17138	Ahu complex	Unknown
17139	Lava tube	Shelter/historic butchering site
17140	Ahu	Marker
17142	Ahu	Marker
17143	Quarry	Resource procurement
17144	Overhang shelters	Shelter
17145	overhang shelter	Shelter

**Table 8-25**  
**Archaeological Sites Recommended as Eligible to the NRHP at PTA** *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
17147	Ahu	Marker
17148	Overhang shelter	Shelter
17149	Overhang shelter	Shelter
17150	Lava tube	Shelter/habitation
17151	Lava tube	Shelter/habitation
17153	Ahu	Marker
17154	Overhang shelter	Shelter
17155	Lava tube	Shelter (historic)
17156	Lava tube	Resource procurement/religious
17157	Overhang shelter	Shelter
17158	Lava tube	Shelter
17159	Ahu	Marker
17160	Quarry	Resource procurement
17161	Overhang shelter	Shelter
17162	Quarry	Resource procurement
17163	Lava tube	Historic shelter
17164	Quarry	Resource procurement
17165	Quarry	Resource procurement
17166	Quarry	Resource procurement
18671	Lava tube	Shelter/habitation
18672	Lava tube	Shelter/habitation
18673	Lava tube	Shelter/habitation/religious
18674	Shrine	Religious
18675	Quarry	Resource procurement
18676	Shrine	Religious
18677	Site complex	Religious
18678	Platform	Religious
18679	Trail	Transportation
18680	C-shape	Shelter
19490	Lava tube, C-shape, trail	Shelter/habitation/transportation
19491	Lava tube	Sandalwood resource procurement
19492	Lava tube	Shelter/resource procurement
19493	Overhang shelter	Shelter
19494	Overhang shelter	Shelter
19495	Lava tube	Shelter/habitation
19496	Lava tube	Water procurement
19497	Lava tube	Shelter/habitation

Table 8-25  
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
19498	Lava tube blister	Shelter
19499	Lava tube	Shelter/habitation/resource procurement
19500	Lava tube	Shelter
19501	Lava tube	Shelter/habitation/water and resource procurement
19502	Lava tube	Water procurement
19503	Lava tube	Shelter
19504	Lava tube	Water procurement
19505	Lava tube	Shelter/resource procurement
19506	Lava tube	Shelter/water procurement
19507	Overhang shelter	Shelter
19508	Lava tube	Water procurement
19509	Lava tube	Water procurement
19510	Quarry	Resource procurement
19511	Lava tube	Water procurement
19512	Lava tube	Shelter
19513	Lava tube	Shelter/water procurement
19514	Lava tube	Shelter/habitation/resource procurement
19515	Lava tube	Shelter/habitation/resource procurement
19516	Lava tube	Water procurement
19517	Lava tube	Water procurement
19518	Lava tube	Shelter/habitation
19519	Lava tube	Resource procurement
19520	Lava tube	Shelter
19521	Lava tube	Shelter
19522	Lava tube	Shelter
19523	Lava tube	Shelter/habitation/resource procurement
19524	Lava tube	Shelter
19525	Lava tube	Shelter
19526	Lava tube	Shelter
19527	Lava Tube	Resource procurement
19528	<u>Na Ohule Elua Trail</u>	Transportation
19529	Lava tube	Shelter/habitation
21164	Lava tube	Shelter/habitation
21165	Lava tube	Shelter/habitation
21166	Lava tube	Shelter/habitation
21167	Quarry	Resource procurement



Table 8-25  
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21168	Ahu	Marker
21169	C-shape	Shelter
21170	Ahu	Marker
21171	Trail	Transportation
21172	Trail	Transportation
21281	Lava tube	Shelter/habitation
21282	Lava tube	Shelter/habitation
21283	Site complex, lava tube	Shelter/habitation/resource procurement
21284	Ahu complex	Unknown
21285	Lava tube	Shelter/habitation
21286	Lava tube	Shelter/habitation
21287	Lava tube	Shelter/habitation
21288	Ahu complex	Marker, unknown
21289	Shrine	Religious
21290	Shrine	Religious
21291	Lava tube	Shelter/habitation
21292	Lava tube	Shelter/habitation
21293	C-shape	Shelter
21294	Lava tube	Shelter/habitation
21295	Lava tube	Shelter/habitation
21296	Lava tube	Shelter/habitation
21297	Lava tube	Shelter/habitation
21298	Ahu complex	Marker, unknown
21300	Excavated pit	Unknown
21301	Pavement	Unknown
21302	Ahu, petroglyph	Marker, unknown
21303	Lava tube	Shelter/habitation
21304	Quarry	Resource procurement
21305	Lava tube	Shelter/habitation
21306	C-shape	Shelter
21307	Ahu	Marker
21308	C-shape	Shelter
21309	Lava tube	Shelter/habitation
21310	Ahu	Marker
21311	Ahu, platform	Marker, religious
21312	Lava tube	Shelter/habitation
21313	Pits, area I	Unknown

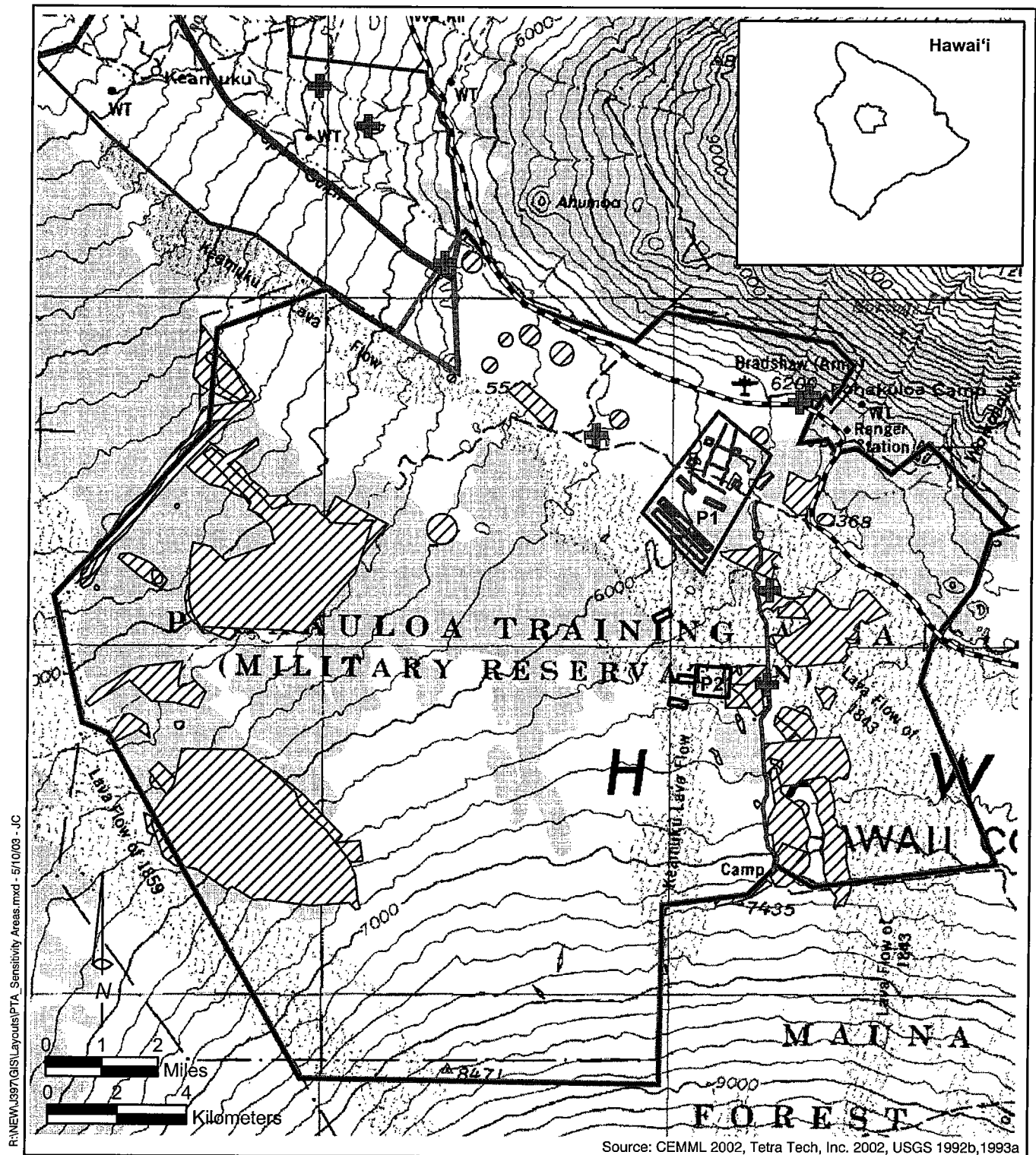
**Table 8-25**  
**Archaeological Sites Recommended as Eligible to the NRHP at PTA** *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21314	Pits, area II	Unknown
21315	Pits, area III	Unknown
21316	Pits, area IV	Unknown
21351	Site complex	Workshop
21483	Lava tube	Shelter/habitation
21484	Lava tube	Shelter/habitation
21485	Lava tube	Shelter/habitation
21486	Lava tube	Shelter/habitation
21487	Lava tube	Shelter/habitation
21488	Lava tube	Shelter/habitation
21489	Lava tube	Shelter/habitation
21490	Lava tube	Shelter/habitation
21491	Lava tube	Shelter/habitation
21492	Lava tube	Shelter/habitation
21493	Quarry, excavated pit	Resource procurement, unknown
21494	Lava tube	Shelter/habitation
21495	Site complex	Unknown
21496	Lava tube	Shelter/habitation
21497	Lava tube	Shelter/habitation
21498	Lava tube	Shelter/habitation
21499	Ahu complex	Unknown
21500	Ahu complex	Unknown
21501	Lava tube	Shelter/habitation
21502	Lava tube	Shelter/habitation
21503	Site complex	Religious
21665	Lava tube	Shelter/habitation
21666	Quarry	Resource procurement
21667	Quarry	Resource procurement
21668	Quarry	Resource procurement
21669	Quarry	Resource procurement
21670	Quarry	Resource procurement
21671	Quarry	Resource procurement
21672	Quarry	Resource procurement
21673	Quarry	Resource procurement
21674	Quarry	Resource procurement
21744	Lithic, pavement	Resource procurement, lithic workshop
21745	Lava tube	Shelter/habitation

**Table 8-25**  
**Archaeological Sites Recommended as Eligible to the NRHP at PTA** *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21746	Site complex	Unknown
21747	Lava tube	Shelter/habitation
21748	Excavated pit	Unknown
21749	Lava tube	Shelter/habitation
21750	Shrine	Religious
21807	Lava tube	Shelter/habitation
21809	Lava tube	Shelter/habitation
22941	Lava tube, lithic	Resource procurement
23450	Ahu	Marker
23451	Lava tube	Shelter
23452	Enclosure	Unknown
23453	Enclosure	Unknown
23454	Modified outcrop	Unknown
23455	Excavated pit complex	Resource procurement
23456	Enclosure	unknown
23457	Trail	Transportation
23458	Quarry	Resource procurement
23459	Enclosure	Shelter
23460	Lava tube/modified outcrop	Shelter
23461	Enclosure	Shelter
23462	Ahu	marker
23463	Excavated pit complex	Resource procurement
23464	Site-complex	Shelter/habitation
23465	Lithic scatter	Lithic workshop
23466	Lava tube	Shelter/habitation
23621	Excavated pit complex	unknown
23622	Excavated pit complex	unknown
23625	Lava tube	Shelter/habitation
23626	Lava tube	Shelter/habitation

Source: IARII 2003



Archeological sensitivity areas have been compiled from many sources for Pōhakuloa Training Area.

#### Legend

- Pōhakuloa Training Area Boundary
- 1010 Land Purchase Area
- P7 West Pōhakuloa Training Area Land Acquisition Area
- P1 Battle Area Complex
- P2 Anti-Armor Live-fire and Tracking Range
- Saddle Road
- Red Leg Trail
- ▨ Sensitive Areas
- + P10 Fixed Tactical Internet
- P3/P4 Pōhakuloa to Kawaihae Trail

## Archeological Sensitivity Areas at Pōhakuloa Training Area

Island of Hawai'i, Hawai'i

**Figure 8-38**

**Table 8-26**  
**Archaeological Sites at PTA within the AALFTR and BAX**

Site No. 50-10-31-*	Site Name/Type	Probable Function	Probable Age
18673	Lava tube system	Habitation ceremonial	Late prehistoric
21285	Lava tube cave	Shelter/ habitation	Prehistoric
21299	Lava tube cave	Shelter/ habitation	Prehistoric
21306	Lava tube cave	Shelter/ habitation	Prehistoric
23463	Excavated pit complex	Possible bird nesting	Prehistoric
23465	Lithic scatter	Lithic workshop	Prehistoric
23622	Excavated pit complex	Possible bird nesting	Prehistoric
23625	Lava tube cave	Shelter/ habitation	Prehistoric
19490	Site complex: 4 lava tubes, 2 trails, 1 C-shape, 4 ahu	Habitation transportation markers	Prehistoric /historic
23450	Rock mound	Marker	Prehistoric
23451	Lava tube	Shelter	Prehistoric
23452	Enclosure	Unknown	Unknown
23453	Rock mound	Unknown	Prehistoric
23454	Modified outcrop	Unknown	Prehistoric
23455	excavated pit complex	Resource procurement	Prehistoric
23456	Enclosure	Unknown	Prehistoric
23457	Trail	Transportation	Prehistoric
23458	Chill glass quarry	Resource procurement	Prehistoric
23459	Rock shelter	Shelter	Prehistoric
23460	Lava tube/ modified outcrop	Shelter	Prehistoric
23461	Rock shelter	Shelter	Prehistoric
23462	Ahu	Marker	Unknown
23464	Site complex: overhang shelter, enclosure, modified outcrop	Shelter/ habitation	Prehistoric
23621	Excavated pit complex	Unknown	Prehistoric
23626	Lava tube cave	Shelter/ habitation	Prehistoric

Sources: Roberts et al. 2003; IARII 2003

Seventeen sites have been found in the proposed area for the BAX, including excavated pit complexes, rock shelters, modified outcrops, rock mounds, a cairn, a lava tube, a lithic scatter, and an enclosure. One site, a complex of lava tubes, trails, enclosures, and a shrine had been identified prior to archaeological survey for the Proposed Action (Reinman and Pantaleo 1998b). The GANDA survey of the entire BAX area revealed the presence of an additional 16 sites (Roberts et al. 2003). Except for the ahu or cairns, whose age is uncertain, all features seem to be prehistoric in age. Table 8-26 lists the archaeological sites within these two project areas.

*Historic Structures and Military Landscapes*

The cantonment area includes 138 structures, including Quonset huts that date from 1955 to 1958. The condition of all structures has been assessed, and they appear to be NRHP eligible. The Army has agreed to preserve some of them. Other associated structures within the cantonment area and BAAF and throughout the PTA have been evaluated for NRHP eligibility for either the World War II or Cold War eras. Although no structures have been determined as eligible, the Army has agreed to preserve some of the buildings. An MOA is in development covering treatment.

*PTA Trail*

While Kawaihae Harbor has no archaeological sites, records indicate that the nearshore area contains an underwater shark heiau. The trail itself runs inland from the harbor and then turns south, paralleling the current highway. It passes John Young's house on the coastal side of the property and then turns inland again as it crosses the lands of Pu'u Kohola National Historic Park, between Young's homestead and the two heiau in the park. The Pu'u Kohola Heiau is associated with the founding of the Hawaiian kingdom. Built between 1790 and 1791 by Kamehameha I, it was constructed to incur the favor of the war god Kuka'ilimoku (National Park Service 2004).

Near the harbor to the north and east, there are other areas rich in archaeological site, additional sites have been located along the proposed alignment for PTA Trail as the trail approaches the installation (Table 8-27). Figure 8-39 shows archaeological sensitivity areas for PTA Trail and WPAA.

**Table 8-27**  
**PTA Trail Archaeological Sites**

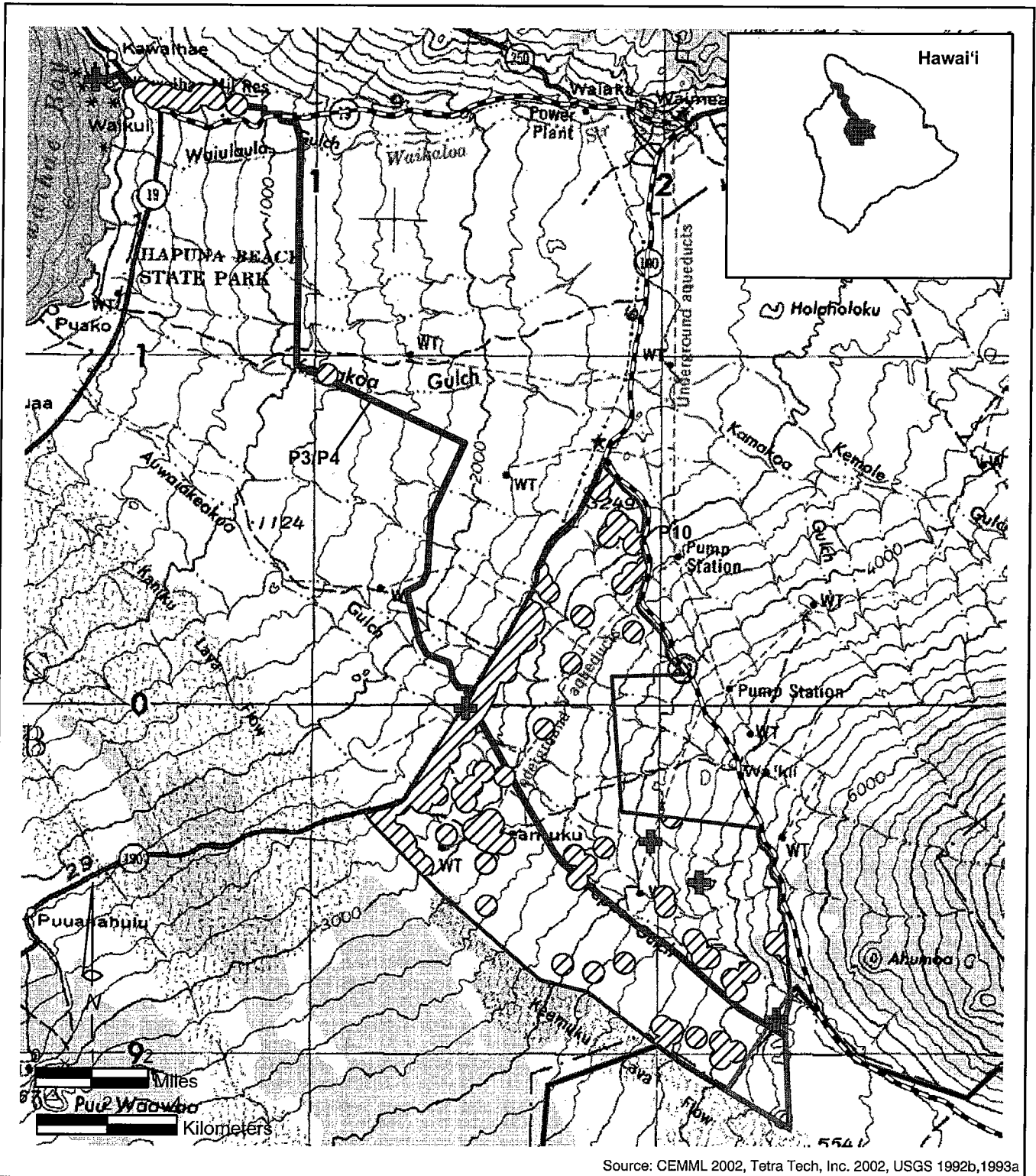
Site Number	Site Type	Probable Function	Probable Age
50-10-05-9012	Wall	Cattle boundary	Historic
50-10-05-23601	Retaining wall	Cart road	Historic
50-10-05-23602	Mound	Marker	Historic
50-10-05-23623	Wall network	Cattle boundary	Historic
50-10-05-23624	Terrace	Possible habitation	Possibly prehistoric
None	Lava blister	Possible burial	Possibly prehistoric
None	Mound	Undetermined	Undetermined

Source: IARII 2003

GANDA surveyed a 98-foot- (30-meter-) wide corridor along the proposed trail, between Kawaihae Harbor and Māmalahoa Highway, and identified seven archaeological sites (Roberts et al 2003). Four sites are likely post-Contact or Historic in age. Two of these are segments of rock walls used as cattle enclosures or boundaries for Parker Ranch. One site is a stone mound possibly used as a trail marker. The fourth historic site, immediately inland from Kawaihae, consists of the remains of a .62-mile- (1-km-) long stretch of a cart road probably representing the main road built in the mid-1800s between Kawaihae and Waimea. Preserved features of the road include bridge foundations built of cobbles and boulders, milled lumber from the bridges with nails in place, stone retaining walls, and possible pahoehoe barrow pits from which construction material was obtained.



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## Archaeological Sensitivity Areas at West PTA and PTA Trail

Island of Hawai'i, Hawai'i

- Legend**
- |   |                                   |
|---|-----------------------------------|
| Pōhakuloa Training Area Boundary                      | P10 Fixed Tactical Internet       |
| 1010 Land Purchase Area                               | P3/P4 Pōhakuloa to Kawaihae Trail |
| P7 West Pōhakuloa Training Area Land Acquisition Area | Saddle Road                       |
| Sensitive Areas                                       | Red Leg Trail                     |

**Figure 8-39**

8-194

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Two possibly prehistoric sites include a lava blister, which might contain a burial, and a terrace that may have been used during the prehistoric period. No cultural materials were found in association with the prehistoric features during the survey. The seventh site recorded consists of a stone mound of undetermined age.

#### Potential Stryker Maneuver Areas

GANDA conducted a Phase I reconnaissance survey of approximately 9,000 acres for the SBCT Go-Areas at PTA (GANDA 2003d). The PTA Go-Areas include a portion or all of training areas 1, 2, 4, 6, 9, 12 to 16, 18, and 19. The survey was conducted between May 19 and July 11, 2003.

Twenty-two sites or site complexes were identified, including traditional Hawaiian sites: habitation complexes, rockshelters, pahoehoe pits, 'a'ā pit complexes, and a lithic scatter. One of the habitation complexes has a pictograph panel with six anthropomorphic figures, one Lono figure, one dog figure, and six linear figures. These are the first pictographs identified at PTA.

Also unusual were the 'a'ā pit complexes identified in the Go-Areas. The pits were excavated into the surrounding 'a'ā flow with the excavated material often piled around the perimeter of the pit forming a partial or complete enclosure. In some cases the 'a'ā pits were horizontally excavated into naturally occurring outcrops within the 'a'ā flow. Little to no soil occurs within the pits. The function of the pits is undetermined.

With the exception of the 'a'ā pits and the pictograph panel, all features and site types identified within the Go-Area are common to PTA and represent short-term occupation, resource exploitation, and lithic workshop.

#### West PTA Acquisition Area

The WPAA is west and north of PTA proper. Under the Proposed Action the Army would acquire approximately 23,000 acres (9,308 hectares) of fee-simple land from the Richard Smart Trust (Parker Ranch). The area is roughly triangular-shaped and lies between the west boundary of PTA, Māmalahoa Highway, and Saddle Road. The proposed land acquisition area surrounds the Waiki'i Ranch development on its north, west, and south sides. It is would be used as a force-on-force training area.

Prior to 2002, two archaeological surveys had been conducted of small portions of the WPAA. During survey of the Waikoloa Maneuver Area, Ogden conducted a limited survey within the WPAA and identified two sites, a rock shelter (Site 22929) near one crater and a dryland agricultural complex (Site 22933) within another crater (Robins et al. 2001). PHRI conducted survey of several proposed corridors for the Saddle Road through the area and identified five sites, although two historic sites adjacent to Saddle Road were considered not eligible to the NRHP and not described or given state site numbers. The other sites included a portion of the historic Old Waimea-Kona Belt road (Site 20855), the Ke'āmuku Sheep Station (Site 23529), and two enclosures (Site 20852) that were reported by an informant to be associated with a burial (Langlas et al. 1997). The exact location of the last site has not been disclosed, and it is not known if it is included among the sites later recorded in the area.

In 2002, GANDA surveyed the entire WPAA for archaeological resources. GANDA found 90 new sites and relocated four of the seven previously known sites; thus, a total of 97 sites have been identified in the area (Table 8-28). The sites include ahu, C-shaped stone mounds (one with bone fragments), an enclosed excavated pit, mounds, a mound complex (with over 20 mounds), rock piles, enclosures, an enclosed platform, wall sections, a wall-mound-terrace complex, and a petroglyph (IARII 2003). Military features were not recorded as sites. An ancient trail, the Hualālai-Waikiʻi Trail, would have crossed the parcel, but no evidence of the trail was found during the surveys.

**Table 8-28**  
**PTA Go-Area Archaeological Sites**

<u>State Site # -</u>	<u>Site Type</u>	<u>Feature Types</u>
<u>50-10-31-23933</u>	<u>Multi-use complex</u>	<u>Enclosure, excavated 'a'ā pits, wall, cairn</u>
<u>50-10-31-23934</u>	<u>'A'ā pit complex</u>	<u>'A'ā pits</u>
<u>50-10-31-23935</u>	<u>Repeated-use hab complex</u>	<u>Rockshelter, pictographs, wall, hearth, terrace, mod outcrops, lava tube, alignment and a cairn</u>
<u>50-10-31-23936</u>	<u>Limited-use hab complex</u>	<u>Enclosure, wall</u>
<u>50-10-31-23937</u>	<u>'A'ā pit complex</u>	<u>'A'ā pits</u>
<u>50-10-31-23938</u>	<u>Wall</u>	-
<u>50-10-31-23939</u>	<u>'A'ā pit complex</u>	<u>'A'ā pits</u>
<u>50-10-31-23940</u>	<u>Wall</u>	-
<u>50-10-31-23941</u>	<u>Ranching complex</u>	<u>C-shape, terrace, walls</u>
<u>50-10-31-23942</u>	<u>Cairn</u>	-
<u>50-10-31-23943</u>	<u>'A'ā pit complex</u>	<u>'A'ā pits</u>
<u>50-10-31-23944</u>	<u>Rockshelter</u>	<u>Rockshelter, work area, enclosure</u>
<u>50-10-31-23945</u>	<u>Modified sink</u>	<u>Lava tubes, mounded wall</u>
<u>50-10-31-23946</u>	<u>Enclosure</u>	-
<u>50-10-31-23947</u>	<u>Rockshelter</u>	-
<u>50-10-31-23948</u>	<u>Multi-use complex</u>	<u>'A'ā pits, alignments, mound, lithic scatter</u>
<u>50-10-31-23949</u>	<u>Limited-use hab complex</u>	<u>Enclosure, modified outcrop</u>
<u>50-10-31-23950</u>	<u>Mound</u>	-
<u>50-10-31-23951</u>	<u>Lava tube</u>	-
<u>50-10-31-23952</u>	<u>'A'ā pit complex</u>	<u>'A'ā pits</u>
<u>50-10-31-23953</u>	<u>Limited-use hab complex</u>	<u>Lava tube, wall</u>
<u>50-10-31-23954</u>	<u>Lithic scatter</u>	-

### **Known Areas of Traditional Importance**

As discussed above, Social Research Pacific (SRP) is conducting an oral history survey of PTA to define and locate TCPs, as defined in Section 3.11.2, and other ATIs at PTA. None of the potential ATIs identified in the draft report (SRP 2002) fall within the areas of the Proposed Action. The Ahu a 'Umi heiau is constructed on the plain on the interior slope of Mount Hualālai, well outside of the SBCT project area, although trails that cross PTA lead to this area. A major battle was said to have occurred in the plain, with the result determining

**Table 8-29**  
**WPAA Archaeological Sites**

Site No.	Site Name/Type	Probable Function	Probable Age
50-10-21-20852	Unknown	Ranching	Historic
50-10-21-20854	2 enclosures and trash scatter	Habitation animal pen	Historic
50-10-33-20855	Road, "waimca-kona belt road"	Transportation	Historic
50-10-21-21132	Unknown	Possible burial	Unknown
1522-102	Unknown	Quarry	Unknown
1522-105	Unknown	Ranching	Historic
20854	C-shape complex	Habitation	Historic
22929	Terrace-enclosure complex	Temporary habitation/agriculture	Historic?
22933	Rock shelter	Temporary habitation	Pre-Contact/historic
23467	Enclosure	Agriculture	Undetermined
23468	Mound	Possible burial	Undetermined
23469	Mound-cairn-wall complex	Undetermined/marker	Undetermined
23470	Cairn	Marker	Undetermined
23471	Cairn	Marker	Undetermined
23472	Cairn	Marker	Undetermined
23473	Mound complex	Undetermined	Undetermined
23486	Wall	Agriculture	Undetermined
23487	Enclosure/excavated pit	Agriculture	Undetermined
23488	Mound	Agriculture/land clearing	Undetermined
23489	Mound	Ranching/land clearing	Post-Contact
23490	Enclosure	Ranching	Post-Contact
23491	Mound	Ranching/land clearing	Post-Contact
23492	Wall section	Boundary remnant	Post-Contact
23493	Mound	Ranching/land clearing	Post-Contact
23494	Cairn	Marker-painted white	Modern
23495	Wall-mound-terrace complex	Temporary habitation/agriculture	Post-Contact?
23496	Platform	Habitation?	Undetermined
23497	Enclosure-C-shape-wall complex	Possible habitation	Pre-Contact
23498	Cairn	Survey marker	Post-Contact
23499	Enclosure-concrete basin	Cistern	Post-Contact
23500	Parallel walls	Possible cattle chute	Post-Contact
23501	Petroglyph	Rock art	Pre-Contact
23502	Cairn	Marker	Undetermined
23503	Cairn	Marker	Undetermined
23504	Cairn	Marker	Undetermined
23505	Enclosure-platform	Possible burial	Pre/post-Contact
23506	Wall	Possible cattle chute	Post-Contact
23507	Rock shelter	Temporary habitation	Pre-Contact
23508	Terrace	Agriculture?	Undetermined
23509	Mound complex (20+)	Quarry material?	Post-Contact
23510	Mound (on Pu'u Iwa'iwa)	Survey marker	Post-Contact
23511	C-shape	Temporary habitation	Pre-Contact
23512	Enclosure	Permanent habitation (near old Mama road)	Post-Contact

**Table 8-29**  
**Archaeological Sites** *(continued)*

Site No.	Site Name/Type	Probable Function	Probable Age
23513	Cairn	Survey marker?	Modern?
23514	Cairn	Survey marker?	Modern?
23515	C-shape	Temporary habitation	Post-Contact
23516	Retaining wall	Road bed-Ke'amuku Station	Historic
23517	Enclosure, mound, burial	Military training/cremation burial	Multiple
23518	<u>Retaining wall</u>	<u>Ranch road</u>	<u>Historic</u>
23519	Wall-enclosure	Boundary/habitation	Historic
23520	Mounds complex	Land clearing	Post-Contact
23521	Mounds	Land clearing/quarrying	Post-Contact
23522	Mound complex	Land clearing	Post-Contact
23523	Terrace	Land clearing	Post-Contact
23524	Cairn	Marker	Post-Contact
23525	Mound	Marker	Historic/modern
23526	Enclosure remnant	Ranching/quarrying?	Historic
23527	Pictograph	Rock art	Pre/post-Contact
23528	Cairn	Marker	Historic/modern
23529	Cairn	Ahupua'a boundary marker	Historic
23530	Cairn	Ahupua'a boundary marker	Historic
23531	Cairn	Ahupua'a boundary marker	Historic
23532	Cairn	Ahupua'a boundary marker	Historic
23533	Cairn	Marker	Historic/modern
23534	Mound	Marker	Historic/modern
23536	Mound	Ahupua'a boundary marker	Historic
23537	Mound	Ahupua'a boundary marker	Historic
23538	Mound	Marker/land clearing	Historic/modern
23539	Ke'amuku Village complex	Sheep-cattle station; permanent habitation; animal pens; possible burial.	Historic
23540	Retaining wall	Possible historic road section.	Historic
23541	Enclosure complex	Sheep farming	Historic
23542	C-shape	Temporary habitation/hunting?	Historic
23543	Mound complex	Land clearing/road material?	Historic
23574	Mound	Land clearing/marker?	Historic
23575	Mound complex	Land clearing/road material?	Historic
23576	Concrete structure	Foundation	Historic
23577	Mound complex	Land clearing/road material?	Historic
23578	Retaining wall	Possible road	Historic
23579	Mound-terrace-enclosure complex	Temporary habitation; agriculture?	Historic
23580	Mound	Land clearing/road material?	Historic
23581	Mound-mod. Outcrop complex	Land clearing/road material?	Historic
23582	Mound	Land clearing/road material?	Historic
23583	Mound complex	Land clearing/road material?	Historic
23584	Mounds	Land clearing/road material?	Historic
23585	Mound complex	Land clearing/road material?	Historic
23586	Mound complex	Land clearing/road material?	Historic
23587	Mound	Land clearing/road material?	Historic
23588	Faced mound	Marker?	Historic
23589	Mound	Land clearing/road material?	Historic

**Table 8-29**  
**Archaeological Sites** (*continued*)

Site No.	Site Name/Type	Probable Function	Probable Age
23590	Mound complex	Land clearing/road material?	Historic
23591	Lava tube	Temporary habitation; burial	Pre-Contact
23592	Mound	Marker	Historic/modern
23593	Mound complex	Markers	Historic/modern
23594	Mound	Marker/possible temporary habitation	Historic?
23595	Mound complex	Land clearing/road material?	Historic/modern
23596	Mound	Land clearing	Historic/modern
23597	Mound	Land clearing	Historic/modern
23598	Mound complex	Land clearing?	Historic/modern
23599	Mound complex	Quarry piles/ranching?	Historic/modern
23600	Mound	Land clearing	Historic/modern
23620	Mound complex	Land clearing	Historic/modern

Source: IARII 2003, Roberts et al. 2003

how the island would be divided after 'Umiāloa's death. Preliminary work on the ATIs of PTA by SRP reveals that the grandparents of some kūpuna or elders were known to cross the island via 'Umi's Road.

ATIs may include previously identified archaeological sites. Almost all sites at PTA are Native Hawaiian sites and reflect the traditional types of activities that Hawaiians conducted in this region. Activities included procurement of lithic (stone) resources, primary preparation of tools in workshops, hunting of birds, and collection of nestling birds. A few sites incorporate ritual aspects. Streck (1986b) interprets a basalt platform on a terraced mound within a lava tube as a shrine (Site 10269). Shapiro et al. (1995) identify a grouping of rock platforms and open-air sites with stone uprights near Pu'u Koli in the southeastern portion of PTA as a place where prehistoric Hawaiian religious activities took place (Reinman et al. 1998, 17). Ritual permeated traditional Hawaiian life, including everyday work activities, and some of the religious structures at PTA may be occupational shrines, where fowlers, quarry workers, and woodcutters recited formulas and made offerings connected with their work.

Most of the sites in the WPAA are associated with historic era agriculture and ranching activities. Only 10 sites are clearly or possibly of traditional Native Hawaiian origin. These mainly consist of a few agricultural terraces and enclosures and habitation shelters. A few sites may be of special importance to Native Hawaiians: a basalt ledge with a petroglyph, and a boulder face with an anthropomorphic red pigment pictograph.

### 8.11.2 Environmental Consequences

#### ***Summary of Impacts***

Cultural resources impacts related to the Proposed Action at PTA vary depending on the location and nature of the project. There are five significant impacts and two significant and mitigable to less than significant impacts to cultural resources within PTA and the proposed WPAA. Impacts primarily relate to the construction phase and range uses in PTA and the

WPAA. As explained in the mitigation sections below, severity of these impacts would be reduced by compliance with the PA the Army has developed, in consultation with the Hawai'i SHPO, the ACHP, and various Native Hawaiians. The PA is provided in Appendix J.

Mitigation measures for archaeological resources or ATIs will include evaluation for NRHP eligibility and avoidance or data recovery of eligible sites. Impacts on ATIs or TCPs, as defined in Section 3.11.2, will be mitigated through avoidance and monitoring of construction by Native Hawaiian monitors as defined in the PA. Mitigation will be developed in consultation with the SHPO and Native Hawaiians, also in accordance with the provisions of the PA. Documentation of such ongoing consultation is provided in Appendix J.

Four less than significant impacts include the risk to archaeological sites from constructing the FTI, the risk to undiscovered archaeological sites in areas of low potential for subsurface archaeological resource, the risk to historic architecture and landscapes from installation of cables and conduits, and the risk to archaeological sites from troop travel from Kawaihae to PTA. These impacts will be mitigated by complying with the IDP contained in the PA, complying with the Secretary of the Interior's Standards for Rehabilitation of Historic Buildings, and monitoring by installation personnel. Table 8-30 summarizes the potential impacts on cultural resources at PTA.

### ***Proposed Action (Preferred Alternative)***

#### ***Significant Impacts***

Impact 1: Impacts on historic buildings. Ke'amuku Sheep Station, Site 23539, has eight features, including three habitation foundations and remnants of three outbuildings. There is historic debris, wood from former structures, and chicken coops on or near the features (Roberts et al. 2003, 70-72). These buildings may be put at risk from military use, particularly as a result of training exercises that may result in damage to the buildings. Military training in the new range may result in damage to these historic buildings, and other historic ranching features. Impacts may include damage from vehicles, vandalism or fire, among other possible impacts. A Range Maintenance Facility would be built on the west side of the PTA cantonment area, approximately 300 feet (91.4 meters) north of the main entrance from Saddle Road. The cantonment area contains Quonset huts dating from 1955 to 1958 that have not been evaluated for NRHP eligibility as Cold War era properties. Constructing the Range Maintenance Facility would require demolishing eight of these Cold War era buildings (Building numbers T187, T188, T17, T19, T20, T31, T3, and T2).

The Proposed Action would upgrade the 4,750-foot (1,448-meter) runway at BAAF to accommodate C-130 and C-17 aircraft. BAAF was built in 1956 (Langlas et al. 1997, 50) and is a potential Cold War site.

The mitigation measures below will reduce the severity of the impact but not to less than significant levels.

**Table 8-30**  
**Summary of Potential Cultural Resources Impacts at PTA**

<b>Impact Issues</b>	<b>Proposed Action</b>	<b>Reduced Land Acquisition</b>	<b>No Action</b>
Impacts on historic buildings	⊗	⊗	○
Impacts on archaeological resources from range and facility construction	⊗	⊗	○
Impacts on archaeological resources from training activities	⊗	⊗	○
Impacts on ATIs	⊗	⊗	○
Impact on archaeological resources from construction of FTI	⊙	⊙	○
Impacts from installation information infrastructure architecture construction	⊙	⊙	○
Impacts on archaeological sites from road construction	⊗	⊗	○
Impacts on archaeological sites from road use	⊖	⊖	○
Impacts on archaeological sites from construction of the ammunition storage facility.	⊖	⊖	○

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

\* Impacts may be mitigable to less than significant.

**LEGEND:**

- |  |     |                     |
|--|-----|---------------------|
| ⊗ = Significant  | +   | = Beneficial impact |
| ⊖ = Significant but mitigable to less than significant | N/A | = Not applicable    |
| ⊙ = Less than significant                              |     |                     |
| ○ = No impact  |     |                     |

Regulatory and Administrative Mitigation 1. The Army will require WPAA buildings to be avoided by using range management protocols, which will require the area around the buildings to be off-limits to military training activities. Ke'amuku Village will be marked as off-limits for training to protect it from damage.

The Army will continue consulting with the SHPO, ACHP, and interested parties in accordance with Section 106 of the NHPA on the proposed PTA master plan to include the preservation and protection of historic buildings in the PTA cantonment area.

Impact 2: Impacts on archaeological resources from range and facility construction. The AALFTR is to be built on Range 3 and Range 8, extending into the ordnance impact area and along the west side of Redleg Trail. The ordnance impact area has UXO and restricted access. The northern BAX parcel extends into the ordnance impact area and north of the trail. There would be no increased impacts on archaeological resources in the ordnance impact area as a result of the Proposed Action.



Eight sites are within the proposed AALFTR area. Site 18673 (an extensive lava tube system containing cultural features and materials) had been previously located within the project area during the survey along the Redleg Trail (Reinman and Pantaleo 1998b). The recent SBCT survey in the AALFTR area (Roberts et al. 2003) identified an additional four lava tube cave sites. All five lava tubes contained evidence of their use as shelters or temporary habitation areas, but in the Site 18673 lava tube, three upright stones were found on basalt ledges, suggesting that these may have been shrines. The other sites consist of two complexes of excavated pits and one lithic scatter. All sites are Native Hawaiian sites that have not been formally evaluated for the NRHP. A total of 17 sites may be affected by construction of the proposed BAX; none of these have been evaluated for eligibility for the NRHP. Site types include excavated pit complexes, a complex of lava tubes with associated trails and cairns, rock shelters, modified outcrops, rock piles, a stand-alone cairn, a lava tube, a lithic scatter, and an enclosure. Potential impacts include site destruction or damage from construction of BAX/AALFTR facilities.

Facility and range construction involves grubbing vegetation, softening the ground, grading site surfaces, excavating, and moving heavy construction equipment. All of these activities, particularly ground softening, would directly damage or destroy unidentified archaeological resources or would indirectly damage them by contributing to soil erosion. Cultural resources within lava tubes would be particularly subject to damage as a result of ground softening prior to construction of the BAX. The mitigation measures below will reduce the severity of the impact but not to less than significant levels. *Regulatory and Administrative Mitigation 2.* Before construction, the Army will evaluate any archaeological sites within areas subject to range and facility construction. Sites determined to be eligible for the NRHP will be flagged for avoidance. The projects will be designed to avoid all eligible and unevaluated archaeological sites, to the full extent practicable. GIS and GPS information will be given to project designers and range control to ensure sites are considered in project design. If it is not possible to avoid archaeological sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

*Impact 3: Impacts on archaeological resources from training activities.* In addition to the 25 sites within the BAX and AALFTR project areas, 96 archaeological sites (both prehistoric and pre-military historic) have been located within the WPAA. Site types on the parcel include ahu, mounds and mound complexes, an enclosed excavated pit, rock piles, enclosures, partial enclosures (C-shapes), an enclosed platform, wall sections, wall-mound-terrace complexes, a petroglyph, a pictograph, a sheep-cattle station complex, and a historic road.

Training activities on PTA and the WPAA under the Proposed Action would result in increased access by ground troops into the training areas, resulting in possible impacts on archaeological sites, off-road vehicular movement by current force and Strykers, cleanup of unexploded ordnance, and subsurface excavations related to troop maneuvers (e.g., field fortifications and obstacle placement). Live-fire activities on PTA ranges could damage surface or subsurface resources from direct impacts of munitions or explosions, although such activities are directed toward established live-fire ordnance impact areas. Activities such

as ordnance removal, construction of field fortifications or defensive positions, and off-road vehicular movement could cause site destruction or damage directly or indirectly through soil erosion. As discussed in Section 8.9, soil erosion is expected to increase at PTA under the Proposed Action. Unrestricted Stryker maneuvering is identified as a potential source of damage to archaeological sites. This type of damage would be more likely in the WPAA than at the AALFTR or BAX, based on the Army's preliminary maneuverability maps for the installation and the dozens of archaeological sites located within the unrestricted maneuvering area. These sites would be at significant risk of damage from training exercises through direct and indirect effects of mounted maneuvers. The mitigation measures below will reduce the severity of the impact but not to less than significant levels.

Regulatory and Administrative Mitigation 3. The Army will evaluate archaeological sites within training areas related to SBCT. Sites determined to be eligible for the NRHP and sites pending evaluation will be identified and avoided through protective measures, to the full extent practicable. If avoidance of identified archaeological sites or newly discovered sites is not feasible, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA

Impact 4: Impacts on Areas of Traditional Importance. SRP (2002) is conducting a TCP survey at PTA to identify ATIs. As noted previously, evidence indicates the possible presence of ATIs, including burials in the ROI of PTA, although the survey did not identify any ATIs within the project areas.

There would be no noise impacts on ATIs at Mauna Kea because the noise analysis shown in Section 8.6 indicates that noise contours relating to ordnance use and construction under SBCT would not extend much beyond the PTA boundaries.

Conducting military training at the WPAA would limit access to the property. There are cultural resources of Native Hawaiian origin on the property, and it is possible that some of these resources constitute ATIs. Converting the use of the parcel to military training may also damage or destroy any unrecorded sites. Native Hawaiians consider range and training activities inappropriate and disrespectful uses of the land that disturb and change the character and feeling of spiritual places.

One FTI antenna will be placed on Mauna Loa, nine others will be located around PTA and the WPAA, and one more will be erected at Kawaihae. While the precise locations of the FTI sites will avoid archaeological resources, Mauna Loa has been identified as a particularly sacred element of the Native Hawaiian cultural landscape. While the antennas would be erected on top of existing support structures, the construction may be considered to have an adverse effect on the nature of the cultural landscape. ATIs and burials, if located within the area of construction activities or new training areas, would be at risk of damage or destruction as a result of the Proposed Action. Impacts could be caused by human presence in the area, physical disturbance from human or vehicle passage, or actual damage from

excavation or erosion. The mitigation measures described below will reduce the severity of these impacts on ATIs.

Regulatory and Administrative Mitigation 4. Facility construction or training area uses will be designed to avoid identified traditional places and limit visual impacts on TCPs by site location, design, and orientation, where feasible.

If avoiding identified TCPs or ATIs is not feasible because of interference with the military mission or risk to public safety, the Army will consult with the SHPO and Native Hawaiians in accordance with the PA to identify impacts and to develop appropriate mitigation measures. Mitigation for impacts on the cultural landscape could include consulting with Native Hawaiians and monitoring of construction by a cultural monitor.

The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with AIRFA and Executive Order 13007, on a case-by-case basis. This access program will be expanded to include new land acquisitions.

The Army previously identified Native Hawaiian burial sites in the SBCT ROI. The Army completed notification and consultation for these burial sites, in accordance with NAGPRA, and left these human remains in place. To address any impacts on any burial sites, or an inadvertent discovery of Native Hawaiian human remains or funerary objects, the Army will abide by all notification and consultation requirements outlined in Section 3 of NAGPRA.

Impact 5. Road construction impacts on archaeological sites. Acquisition and construction of PTA Trail would occur along a different alignment than the trail now used by military units traveling from Kawaihae Harbor to PTA. The seven cultural resources identified in the trail corridor, sites near the corridor, and in or near construction staging areas may be adversely affected during construction. Many archaeological sites have been identified near the northern end of the trail alignment. The large number of sites within the WPAA may also be affected, and until the location of the roads are selected, the potential impacts to sites that may be in close proximity to the roads can not be assessed.

PTA Trail as established, avoids all archaeological and historic sites in the Kawaihae area, but any alteration in the alignment could result in impacts on historic properties.

Constructing PTA Trail would involve grubbing vegetation, grading soil, and the regular use of heavy equipment. This activity could expose or disturb surface or subsurface cultural resources. Off-road movement of construction vehicles also could cause erosion, which could lead to damage of undiscovered sites in the vicinity of project operations. All of these activities could result in direct destruction or damage of archaeological resources or indirect damage by contributing to soil erosion. The mitigation measures below will substantially reduce the impact but not to less than significant levels.

Regulatory and Administrative Mitigation 5. In accordance with the PA, the Army will identify cultural properties, evaluate cultural properties for NRHP eligibility, and implement avoidance strategies to the full extent practicable. GIS and GPS information will be provided

to project designers to ensure sites are considered in the design and construction of all the proposed military vehicle trails and training roads in WPAA. If it is not possible to avoid archaeological sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

#### Significant Impacts Mitigable to Less than Significant

Impact 6: Impacts on archaeological resources from road use. Impacts on sites along PTA Trail from military use of the trail could include erosion and possible vandalism or human access. These impacts are likely to be less than significant and will be mitigated by regular monitoring by installation cultural resources personnel. Road use within WPAA, however, poses a greater risk to resources recorded within the proposed new training area. The large number of gravel roads proposed would create additional impacts to sites within the WPAA including erosion and possible vandalism or human access. The mitigation measures below will reduce the severity of the impact to less than significant levels.

Regulatory and Administrative Mitigation 6. Eligible and unevaluated sites will be flagged and mapped on a range control GPS map. Installation cultural resources staff will monitor the sites regularly. Participants in training activities on the ranges will be ordered to avoid identified sites. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

Impact 7: Impacts on archaeological sites from construction of the ammunition storage facility. The ammunition storage facility project involves the construction of three earth-covered ammunition storage buildings adjacent to existing ammunition storage buildings. There is one site complex (site 23455) of pahohoe pits so there is a potential for a significant impact.

Regulatory and Administrative Mitigation 7. Before construction, the Army will complete the evaluation of any archaeological sites within areas subject to range and facility construction. Sites determined to be eligible for the NRHP will be flagged for avoidance. The projects will be designed to avoid all eligible and unevaluated archaeological sites, to the full extent practicable. GIS and GPS information will be given to project designers and range control to ensure sites are considered in project design. If it is not possible to avoid archaeological sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

#### Less than Significant Impacts

Impacts from installation information infrastructure architecture construction. I3A would involve laying cables and conduits throughout the PTA cantonment area and out to the ranges, motor pool, and other facilities. These would be both underground and aboveground conduits. Excavation to lay cabling and conduits for the I3A project has the potential to disturb archaeological resources. Additionally, the I3A project could require bringing cables and conduits into historic buildings, which would necessitate drilling holes in the buildings and

possibly other more extensive modifications. Depending on the precise location of cable and conduit placements and the level of renovation needed to the buildings, this project could have an adverse effect on the historic integrity of Cold War era buildings or archaeological sites at PTA. The Army is conducting an evaluation of historic structures in the PTA cantonment area and at BAAF. If avoidance is not feasible, adverse effects on historic buildings will be mitigated by compliance with the Secretary of the Interior's Standards for Treatment of Historic Properties. Impacts on buildings and archaeological sites will be mitigated by compliance with the provisions of the PA.

Impacts from construction of a tactical vehicle wash. A tactical vehicle wash would be built during fiscal year 2005. USAG-HI DPW Environmental staff have conducted an assessment of this location and found no cultural resources within the project area (IARII 2003). An archaeological inventory survey will be conducted to confirm this finding prior to initiation of construction.

The Range Maintenance Facility in the PTA cantonment area has no identified archaeological sites within the construction area.

Impacts on archaeological resources from fixed tactical internet construction. Eleven FTI antennas would be erected at PTA, WPAA, and several sites off the installation. While antennas would be mounted on existing support structures where feasible, many of the sites would require construction of a new equipment shed to support the facility. This construction itself would be ground disturbing and could result in adverse impacts on archaeological resources. The Army has surveyed the sites and determined there are no impacts on cultural resources. The sites will be monitored during construction, in accordance with the PA. There would be no impacts on cultural resources from the FTI construction at Kawaihae Harbor, as the project site is completely disturbed, and there are not expected to be any undiscovered cultural resources. Five Cold War era structures at Kawaihae Military Reservation require determinations of eligibility; however, the 7-foot (2.1-meter) antenna support structure to be erected on top of an existing equipment shed would not have any impact on these buildings.

### ***Reduced Land Acquisition Alternative***

The RLA Alternative would produce roughly the same impacts as the Proposed Action, because QTR2 would be on the same disturbed areas as the BAX and AALFTR, and thus would not result in any greater impacts on cultural resources.

### ***No Action Alternative***

#### ***No Impacts***

The existing baseline for cultural resources would continue under No Action. Under the status quo of No Action, military use of PTA would continue at current levels. As a result, there would be no new risk of damage to known or undiscovered archaeological resources. Ongoing activities at PTA under No Action include regular uses of the installation for military exercises, in compliance with Army regulations concerning cultural resources preservation and management. Although the WPAA land would not be acquired, any continued use would also fall under the same preservation measures in place at PTA. Under

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8.11 Cultural Resources

No Action, the TCP survey of PTA would be completed, and any ATIs would be evaluated and managed.